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PROJECT: SOILS TECHNICAL REPORT ON THE COSO GEOTHERMAL STUDY AREA

IN SUPPORT OF: COSO GEOTHERMAL DEVELOPMENT ENVIRONMENTAL STATEMENT

U.S. Department of the Interior
Bureau of Land Management
Bakersfield District Office
800 Truxtun Avenue, Room 311
Bakersfield, CA 93301

Rockwell International

Atomics International Division
Air Monitoring Center
2421 West Hillcrest Drive
Newbury Park, California 91320

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April 1980

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Survey Party Chief:	George Borst
Project Management:	Jeff Peters
Technical Editor	Rudolf Ulrich
Party Crew Members:	Kathy O'Loughlin Gary Andrews
Range Scientist:	Charles Patterson

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1.0 INTRODUCTION

This report presents information on the soils of the Coso Geothermal Study Area (CGSA) including a detailed soils map (scale 1:24,000) and descriptions and interpretations of soil map units and soil taxonomic units. Laboratory data on the sampled soils is included as an appendix. The Coso Soil Survey was completed primarily to provide soils data as an input for a comprehensive Environmental Statement (ES) covering the CGSA. The ES is required prior to initiating a proposed action calling for the leasing of lands within the CGSA for the purpose of developing known and potential geothermal resources. The CGSA encompasses approximately 80,000 acres (126 sq. miles) on public lands adjacent to, and withdrawn lands within the western boundary of the China Lake Naval Weapons Center, Ridgecrest, CA. A secondary reason for completing the soil survey was to provide information on the soils of the area for use by the Bureau of Land Management in preparing the California Desert Plan.

The soil survey data presented herein was conducted in accordance with the procedures and standards of the National Cooperative Soil Survey as developed by the USDA Soil Conservation Service. Thus the soils inventory provides soils data in a standard format that are valuable to a wide variety of users in making land use and land management decisions.

2.0 SCOPE AND METHODOLOGY

A soil survey of third-order intensity, as defined by the U.S. Department of Agriculture, was conducted from November 1978 to March 1979. Soil survey field procedures closely followed those outlined in Soil Survey Manual, Handbook of Soil Survey Investigations Field Procedures, and the National Soils Handbook (USDA Soil Conservation Service 1952, and undated).

The soil survey was made by soil scientists who traversed the area digging holes and examining soils, describing soil profiles, and taking pertinent notes on soils, vegetation, and landscape characteristics. Soils with similar characteristics on similar landforms were grouped together, and dissimilar soils were separated. Soil boundaries were identified by both observations in the field and photo-interpretive techniques. Geologic and topographic maps were also consulted as an aid in identifying landforms, elevations, and slopes. Soil boundaries were delineated in the field on 1:30,000 black and white stereo-paired aerial photography. The soil boundaries were then plotted on a 1:24,000 base map prepared by enlargement of U.S. Geological Survey 15-minute topographic sheets.

The minimum size of mapping unit delineations in this survey is 10 acres for segregation of contrasting soils, and 40 acres for noncontrasting soils. Soil boundaries are considered accurate to ±200 feet, or 1/10th of an inch on the detailed map. Areas of highly contrasting soils or land types smaller than 10 acres are depicted using conventional map symbols, e.g., and ad hoc symbols for those features not covered by convention.

For the purposes of this inventory, groups of contiguous, similar soils were classified at the series level as defined in the USDA soil classification system, Soil Taxonomy (USDA, Soil Conservation Service, 1975b). Series names were tentatively correlated by Mr. Terry Cook, California State Soil Correlator with the Soil Conservation Service, Davis, CA, by reference to the August 1978 edition of Classification of Soil Series of

the United States (USDA, August 1978). Field reviews for quality control purposes were conducted by Mr. Terry Cook and Mr. John Key, soil scientist with the BLM, Bakersfield, CA.

The mapping units used consist either of soil consociations, soil complexes, or soil associations. In some cases the soils were named as variants or taxadjuncts of soil series. Where miscellaneous areas such as rock outcrops or lava flows constitute a significant percentage of the map unit, they are included in the map unit name. Miscellaneous land types were also used as map units where they encompass an area of sufficient extent to separate as a distinct body. Refer to the glossary, Section 10.0, for definitions of terms used in this survey.

3.0 HOW TO USE THIS REPORT

This soil survey contains information that can be applied in managing farms, ranches, rangelands, and wildlife; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of land for agricultural, industrial, residential, hydrologic, and recreational uses.

All the soils in the Coso Geothermal Study Area are represented as groupings of similar soils delineated on a Detailed Soils Map at the back of this publication. In addition, the soils data has been summarized to produce more general descriptions in Section 5.0, with a General Soils Map contained at the back of the report. This map is useful for regional planning purposes.

Soil areas are outlined and are identified by a numerical map unit symbol on the detailed soils map. Because of the intensity and field methods by which this survey was made, most map units consist of two or more soils which occur together in an intricate fashion on a particular landform. These map units are termed complexes as it is impractical or unfeasible to delineate the component soils separately at the field mapping scale used. Some map units have been set up as associations, where the component soils are regularly geographically associated in a defined proportional pattern. All delineated areas marked with the same symbol contain the same constituent soils in about the same proportions. Reference to the Soils Map Legend or to the Identification Legend, Section 6.0, shows the specific composition of the map units. These are estimates of the relative proportions of component soils in a typical landscape or landform. The proportions may vary from one landform unit to another. In many cases, it is possible to more closely identify the location of the component soils in the field by studying geologic and topographic maps and aerial photography and referencing the position of component soils in the landscape as outlined in the map unit descriptions (Section 6.0) and the genetic key to the soils (Table 6-2).

The map unit descriptions are found in Section 6.0, and detailed descriptions of the major individual soils comprising the map units are found in the soil series technical descriptions in Appendix A. Management and interpretation tables (Section 7.0), as well as laboratory data (Appendix B) outline specific properties of the soils and their suitabilities and limitations for different uses. These tables are also organized by map unit symbols keyed to the detailed soils map. The tables are designed primarily as guidelines for areawide planning and management purposes. Site-specific studies are required for design and operational planning purposes.

4.0 GENERAL NATURE OF SURVEY AREA

4.1 CLIMATE

The climate of the Coso area can be characterized as arid, with hot summers and cold winters. Mean annual precipitation ranges from about 5 to 8 inches. The seasonal distribution is predominantly in the winter months; approximately half the precipitation in these months occurs as snowfall, especially at higher elevations.

The mean annual air temperature ranges from 54 to 57^{o}F. The growing season ranges from about 210 to 230 days, with the average date of the first killing frost about the 12th of November and the last killing frost about the 26th of March.

The presence of the Sierra Nevada immediately to the west of the study area forms a rain shadow effect; consequently the western portion of the area is hotter and drier than the area further to the east. This difference is accentuated by orographic effects as the eastern areas are at higher elevations. Aspect and slope position also have a profound effect on local microclimates, with south- and west-facing slopes being more arid and hot than north and east slopes. Midslopes also tend to be somewhat warmer during periods of very cold weather due to the phenomena of cold air drainage.

4.2 VEGETATION

The vegetation in the area consists of desert scrub communities which are typical of the Greater Mojave Desert of Southeastern California. Although the study area is near the northern limits of the Mojave Desert vegetative province, little evidence from the northern sagebrush region of the Great Basin is present.

The plant communities in the study area are determined largely by the low rainfall caused by the rain shadow of the Sierra Nevada. Structurally, the plant communities are sparse to moderately dense expandes of drought-tolerant shrubs, which often include an understory of annual wildflowers and grasses, and occasional perennial bunchgrasses.

Creosote Bush Scrub occurs on well-drained soils of slopes, fans, and valleys at elevations generally below 3,800 feet. Creosote bush *(Larrea tridentata)* and burrobush *(Ambrosia dumosa)* are the dominant plants, and may be found with various lower proportions of cheesebush *(Hymenoclea salsola)*, goldenhead *(Acamptopappus sphaerocephalus)*, felt-thorn *(Tetradymia stenolepis)*, and several other desert shurbs. Creosote bush is generally absent from the lowest valley floors due to ponded soil conditions and cold air drainage. Occasionally, this scrub community is found at elevations up to 4,500 feet.

Shadscale Scrub, dominated by shadscale *(Atriplex confertifolia)*, occurs on the lower fans, around playas, and on more slowly drained soils of small valleys. Nearly pure stands of shadscale are common, with scattered individuals of allscale (*A. polycarpa*) and felt-thorn.

Playas contain another scrub community, Saltbush Scrub. The very poorly drained soils of these valley bottoms and sinks support scattered four-wing saltbush (*Atriplex canescens*), budsage *(Artemisia spinescens)*, and allscale.

At higher elevations and around rock outcrops, there are sparse vegetative communities dominated by desert trumpet (*Eriogonum inflatum*), California buckwheat *(E. fasciculatum)*, goldenbush (*Haplopappus* spp.), mormon tea (*Ephedra* sp.) and rabbitbrush *(Chrysothamnus* spp.).

Scattered throughout the study area, except in playas and lower fans, are joshua trees *(Yucca brevifolia)*.

Although Indian ricegrass *(Oryzopsis milacea)* and needle grass *(Stipa speciosa)* occur throughout the study area, grazing by wild burros and rabbits has generally reduced the stands of grass to small isolated patches around rock outcrops, fence lines, and on steeper slopes. The available forage is restricted to occasional grasses, extensive saltbush, shadscale, and allscale, and occasional winter fat *(Eurotia lanata)*. Productivity appears to be low to moderate by desert standards, and it probably reflects an early history of overgrazing by cattle in the region.

4.3 PHYSIOGRAPHY AND DRAINAGE

The Coso Geothermal Study Area is located on the boundary between the Basin and Range and Sierra Nevada physiographic provinces (Fenneman, 1931). Elevations range from 2800 to almost 6000 feet. Geographically, the area is one of interior drainage with no perennial streams. A chain of loosely interconnected playas along the approximate axis of Rose Valley provides evidence for the existence of an older Pleistocene River channel that carried significant flows during earlier Pluvial periods (Duffield and Smith, 1978a). The channel has apparently been forced laterally and backfilled with alluvial sediments through damming by several geologically recent episodes of basaltic lava flows (Duffield and Smith, 1978b). River gravel deposits are exposed in the lowest part of the valley.

The principal landforms in the area are broad alluvial fans and alluvial plains built out from the surrounding mountains. Several ages of fans can be recognized, from both the degree of dissection of the landform and by the relative degree of soil profile development. The oldest fans are deeply dissected and have soils with shallow strongly silica-cemented hardpans. The somewhat older fans are weakly dissected and have deeper weakly silica-cemented pans. Recent fans consist of deep deposits of sandy materials with little or no dissection apparent in the landscape.

The terrain of the western one-third of the CGSA consists of alluvial fans and a broad north-south trending valley (Rose Valley) in which there are several dry lake beds. The fans to the west of the valley originate

in the Sierra Nevada and are moderately steep, young, and relatively dissected. In places, the Sierra Nevada fault zone offsets younger and older alluvial deposits, the most prominent fault visible as a "spring line." The young fans cover the somewhat older sediments laid down by the ancestral Owens River along the margins of Rose Valley. The valley itself apparently has a more complex geomorphic history, as evidenced by younger and older soils developed on fans, river gravels, valley fill, and aeolian deposits. The fans bordering the eastern edge of the northern part of Rose Valley are considered by geologists to be early Pleistocene or older, as evidenced by the degree of dissection of the landscape, silica cementing of the deposits, and the absence of andesitic or basaltic debris of late Pleistocene age (Stinson, 1977). The fans along the south-east edge of Rose Valley are considerably younger than the aforementioned deposits, because they have weakly silica-cemented subsoils and are only slightly dissected. Remnants of older fans associated with granitic rock outliers in the valley also occur in the unit.

The terrain in the northern and central portion area is characterized by rugged, steep-sided granitic and metamorphic rock uplands; steep, rhyolitic domes; and rolling plains and upland basins composed of pyroclastic sediments. These pyroclastic sediments predominantly are rhyolite lapilli tuff. In the south and southwest portions, there are rough, steep-sided basalt cinder cones and basalt lava flows. The cones and flows represent a complex history of volcanic eruption from numerous individual vents over a period of years from 10,000 to almost 100,000 years B.P. Some 40 discrete volcanic units have recently been mapped and dated by the U.S. Geological Survey in their study of the Coso area (Duffield and Bacon, 1977).

On the eastern border of the survey area, alluvial fans extend from the granitic uplands into the alluvial valley, Coso Basin. This valley also displays a complex geomorphic history with contemporary sediments including young and older fan and valley fill deposits, much older alluvial fanglomerate deposits, and basalt lava flows.

A variety of processes are responsible for creation of the present landscape. Differential weathering and erosion of rocks of varying hardness are of primary importance in the mountainous uplands. These differences are created not only by the lithology of the rocks, but also by shearing of the rocks from faulting and intrusion, and influence by cover of pyroclastic deposits. Volcanic activity, including intrusions, flows, and ash fall deposits, is also an important formative factor. Most of the volcanic activity is recent, and the depositional forms are still well preserved.

Erosion and dissection by running water and reworking of the alluvial sediments by runoff and wind action are the most prominent factors shaping the landscapes of the valleys. The length of time a stable landscape is exposed to weathering and erosion, the source area of detrital sediments, and the mode of deposition serve to distinguish the alluvial deposits.

4.4 GEOLOGY

The western Basin-Range province in southeastern California is characterized by northerly-trending fault block mountains separated by deeply alluviated valleys. The Coso Range segment of the province is formed of rocks of diverse lithologies ranging in age from Precambrian to Holocene (Hall and MacKevett, 1972). The oldest rocks are complexly folded Mesozoic metamorphic rocks, predominantly metavolcanics, gneiss, and quartz biotite schists (Stinson, 1977). This Mesozoic sequence is intruded by Jurassic to Late Cretaceous granitic stocks and plugs which are considered to be probable satellite intrusions of the southern Sierra Nevada (Hulen, 1978). Biotite quartz monzonite, granodiorite, and quartz diorite are the most common granitic rocks exposed. Small bodies of more basic rocks including gabbros and diorites are associated.

The basement rocks are unconformably overlain by Cenozoic volcanic rocks of basaltic to rhyolitic composition (Chesterman, 1956). The volcanic sequence includes cinder cones, rhyolitic domes, basalt flows, and

pyroclastic deposits. Surficial deposits in the area range in age from probable Early Pleistocene to recent. Mappable units include stream deposits, younger and older alluvial fans, wind-blown sands, river gravels, lacustrine deposits, old fanglomerates, and landslide deposits. Most of the rock kinds in the Coso Area have a profound influence on the types of soils developing from them. The General Soils Map, plate 1, can also be interpreted as a map of landforms and geologic parent materials.

5.0 GENERAL SOILS MAP

This section presents the legend used in the 1:62,500 scale general soils map (Table 5-1, Plate 1). Correlations of the generalized soil map associations with the detailed (1:24,000 scale) soil survey map units are presented in Table 5-2. This is followed by descriptions of each general soils map unit.

TABLE 5-1. LEGEND

GENERAL SOILS MAP*

COSO GEOTHERMAL STUDY AREA
INYO COUNTY, CALIFORNIA

Map Symbol	Soils on Valley Floors, Alluvial Fans and Terraces
1	Dunmovin Deep, nearly level to moderately sloping, somewhat excessively drained sandy soils; formed in alluvium
2	Dunmovin-Lavic-Wasco Variant Very deep, nearly level, somewhat excessively to well drained sandy and loamy soils; formed in alluvium
3	Alko Variant-Joshua Variant-Nebona Variant Very shallow to deep, gently sloping to moderately steep, well drained, cobbly sandy soils with hardpans; formed in alluvium
4	Alko Variant-Dunmovin Variant-Nebona Variant Very shallow deep, gently to moderately sloping, somewhat excessively to well drained soils with hardpans; formed in alluvium
	Soils on Uplands and Upland Basins
5	Gass Variant-Garlock Variant-Sparkhule Shallow to moderately deep, moderately sloping to moderately steep, well drained cobbly sandy and loamy soils; formed in basalt and cinders
6	Maynard Lake-Stumble Deep, moderately steep to steep, somewhat excessively drained sandy soils; formed in rhyolite tuff and volcanic ash deposits

Table 5-1 Continued

Map Symbol	Soils on Uplands and Upland Basins (continued)
7	Maynard Lake-Stumble Very deep, nearly level to strongly sloping, somewhat excessively drained sandy soils; formed in alluvium from rhyolite tuff and volcanic ash deposits
8	Coso-Rock Outcrop Very shallow to shallow, moderately steep to steep, somewhat excessively drained stony loamy soils; formed in granite; and rock outcrop
9	Rubble Land-Torriorthents-Rock Outcrop Moderately deep, steep to very steep, excessively drained stony loamy soils on rhyolite domes; rubble land and rock outcrop
10	Cinder Land-Lava Flows

*The texture given in the descriptive heading refers to the texture of the surface layer of the major soils in each map unit.

TABLE 5-2. CORRELATION OF DETAILED SOIL SURVEY MAP UNITS AND GENERAL SOIL MAP ASSOCIATIONS

General Soil Map Symbol	Detailed Survey Map Unit
1	104
	105
	106
	101
2	135
	107
	108
	110
	111
3	150
	180
	182
	183
	190
	155
4	181
5	120
	121
	220
	221
6	140, 240
	141, 241
	170
7	142, 242
8	130
	131
	232
	133, 233
	234
9	160
10	222
	223

SOILS ON VALLEY FLOORS, ALLUVIAL FANS AND TERRACES

1. Dunmovin

Deep, nearly level to moderately sloping, somewhat excessively drained sandy soils; formed in alluvium

This map unit is on alluvial fans and plains of Rose Valley and Coso Valley. The soils formed in alluvium of mixed origin but predominantly from granitic rock. Elevation ranges from 2900 to 3900 feet.

This unit makes up about 21 percent of the survey area. It is about 90 percent Dunmovin soils. The remaining 10 percent is minor soils.

Slope of the Dunmovin soils ranges from zero to 9 percent. The profile consists of loamy sands throughout, with some areas having bouldery surfaces. The soil is commonly calcareous below a depth of about 29 inches.

Minor in this unit are the excessively drained Arizo soils in bouldery and sandy drainageways, the well-drained Lavic soils in stratified alluvial deposits, and the deep, well-drained Garlock soils on dissected alluvial fans and terraces.

Areas of this unit are used for irrigated crops, rangeland, and wildlife habitat, and military reservation.

This soil is suited for irrigated crops. Low available water capacity, sandy surface texture, and the hazard of soil blowing are the main limitations. These limitations affect the soil's potential for producing crops and forage because of its low moisture retention. This soil is suited to only the most drought-resistant crops and forage plants.

Springs occur in the western portion of this unit along the Sierra Nevada escarpment. Wells are used as a source of water supply for sprinkler irrigated alfalfa.

Rodents, reptiles, nongame birds, coyotes, burros, and rabbits are the main kinds of wildlife in this and subsequent map units.

2. Dunmovin-Lavic-Wasco Variant

Very deep, nearly level, somewhat excessively to well-drained sandy and loamy soils; formed in alluvium

This map unit consists of soils on lower valley floors and interplaya dunes and flats of Rose Valley and Coso Valley. The soils formed in mixed stratified alluvium and wind-blown sand deposits. Elevation ranges from 3300 to 4100 feet.

This unit makes up about 6 percent of the survey area. It is about 32 percent Wasco Variant soils, 30 percent Lavic soils, and 21 percent Dunmovin soils. The remaining 17 percent is minor soils.

Wasco Variant soils are well drained. The profile is a sandy loam surface with loamy sand substratum which is weakly cemented. The soil is commonly calcareous below a depth of 15 inches. Lavic soils are well drained. The profile is variably stratified loamy sands, sandy loams, loams, and very gravelly coarse sands. The soil is commonly calcereous and moderately saline. Dunmovin soils are somewhat excessively drained. The profile consists of loamy sands throughout. The soil is commonly calcareous below a depth of about 29 inches.

The minor areas are the very poorly drained, nearly level playas in valley basins and the excessively drained areas of riverwash along ephemeral stream courses. Areas of this unit are used as a source of sand and gravel. This unit is used also for rangeland and wildlife habitat.

The hazard of soil blowing is a limitation to the use of this soil for sand and gravel. Sandy surface textures, low available water capacity, and salt content limit this soil for use as rangeland. Playa areas are subject to periodic ponding, the ephemeral streams are subject to periodic overflow.

3. Alko Variant - Joshua Variant - Nebona Variant

Very shallow to deep, gently sloping to moderately steep, well-drained, cobbly sandy soils with hardpans; formed in alluvium

This map unit is on strongly dissected older alluvial fans and terraces in Rose Valley, Coso Valley, and in areas of the Coso Mountains. The soils formed in alluvium of mixed origin. Elevation ranges from 3100 to 4600 feet.

This unit makes up about 9 percent of the survey area. It is about 25 percent Nebona Variant soils, 25 percent Alko Variant soils, and 15 percent Joshua Variant soils. The remaining 35 percent is minor soils.

Nebona Variant soils are very shallow to shallow. Slope ranges from 2 to 30 percent. They have a cobbly, loamy sand surface layer and a clay loam substratum which is underlain by a silica-cemented hardpan. Alko Variant soils are very shallow to shallow. They have a cobbly, loamy sand surface layer and a clay and gravelly clay subsoil, under which a silica-cemented hardpan occurs. The subsoil of this soil has a high salt content. Joshua Variant soils are deep. They have a surface layer of sandy loam and a clay loam subsoil which is underlain by a weakly silica-cemented gravelly coarse sandy loam.

The minor soils are the well-drained Hooten Variant soils, with a subsurface hardpan on predominantly bouldery, dissected alluvial fans; the excessively drained Arizo soils in bouldery sandy washes; and the somewhat excessively drained Dunmovin soil in drainageways.

Areas of this unit are used mostly for rangeland, wildlife habitat, and military reservation. The major limitations for use as rangeland include limited rooting depth, stones, cobbles, and gravel on the surface, droughtiness, and the hazard of soil blowing. These limitations affect the production of forage suitable for livestock grazing. This unit is suited for use as wildlife habitat.

4. Alko Variant - Dunmovin Variant - Nebona Variant

Very shallow to deep, gently to moderately sloping, somewhat excessively to well-drained soils with hardpans; formed in alluvium

This map unit occurs on slightly dissected, somewhat older alluvial fans of the eastern portion of Rose Valley. The soils formed in alluvium derived predominantly from granitic rock. Elevation ranges from 3400 to 3800 feet.

This unit makes up about 4 percent of the survey area. It is about 50 percent Dunmovin Variant soils, 20 percent Alko Variant soils, and 20 percent Nebona Variant soils. The remaining 10 percent is minor soils.

Dunmovin Variant soils are deep and somewhat excessively drained. They occur along and between widely spaced drainageways. The profile is loamy sand throughout, with a weakly silica-cemented layer starting at a depth of 35 to 40 inches. Alko Variant soils are very shallow to shallow, and well-drained. They occur on older, more dissected alluvial fans of this unit. They have a cobbly, loamy sand surface layer and a clay and gravelly clay subsoil, under which a silica-cemented hardpan occurs. The subsoil of this soil has a high salt content. Nebona Variant soils are very shallow to shallow and well drained. They occur in similar positions as the Alko Variant soils. They have a cobbly loam sand surface and a clay loam substratum, which is underlain by a silica-cemented hardpan.

The minor soils are the well-drained Joshua Variant soils on crests and sideslopes of alluvial fans and the somewhat excessively drained Dunmovin soils along recent drainageways.

This unit is used for rangeland and wildlife habitat. Sandy surface textures, droughtiness, and hazard of soil blowing are the main limitations on the Dunmovin Variant soil. Limited rooting depth and the cobbly surface on the shallow soils affect the use of this unit for rangeland.

SOILS ON UPLANDS AND UPLAND BASINS

5. Gass Variant - Garlock Variant - Sparkhule

Shallow to moderately deep, moderately sloping to moderately steep, well-drained, cobbly sandy and loamy soils; formed in basalt and cinders

This map unit occurs on upland mesa basalt flows and cinder cones, generally in the southern portion of Rose Valley and along the eastern boundary of the survey area. Elevation ranges from 2800 to 4600 feet.

This unit makes up about 7 percent of the survey area. It is about 30 percent Garlock Variant soils, 16 percent Gass Variant soils, and 15 percent Sparkhule soils. The remaining 39 percent is minor soils.

Garlock Variant soils are moderately deep. They formed in basalt and basaltic cinders. Slope ranges from 5 to 15 percent. The profile consists of a cobbly, loamy sand surface layer overlying a clay loam subsoil. The underlying material is cinders in a matrix of coarse sand or basalt, at a depth ranging from 26 to 40 inches.

Gass Variant soils are moderately deep. They formed in basalt. Slope ranges from 5 to 15 percent. The profile consists of cobbly, fine sandy loam overlying a clay and very stony clay loam subsoil. Basalt rock is at a depth ranging from 20 to 40 inches. The subsoil has a high salt content.

Sparkhule soils are shallow. They formed in basaltic cinders. Slope ranges from 5 to 30 percent. The profile consists of a very stony, loamy, fine sand surface layer overlying a gravelly and stony clay loam subsoil. Basalt rock occurs at a depth of 14 to 20 inches.

Minor in this unit are the excessively drained Dunmovin soils occurring as wind-reworked coarse sand on stabilized sand dunes, the fine-loamy, mixed, thermic Typic Haplargids intermixed with the soils of this unit, and basalt rock outcrops and lava flows.

This unit is used for military reservation, rangeland, and wildlife habitat. Areas of this unit are used as a source of cinders. This unit is sutied for use as a source of cinder deposits. Existing cinder pits occur in this unit. This unit is limited for many uses due to rock outcrops, stones, cobbles, and gravel on the surface. The high salt content of the Gass Variant soil limits the area to more salt-tolerant plants.

6. Maynard Lake - Stumble

Deep, moderately steep to steep, somewhat excessively drained sandy soils; formed in rhyolite tuff and volcanic ash deposits

This map unit is on sideslopes and toeslopes of rhyolitic domes and granitic uplands, and upland valleys of the Coso Range. Elevation ranges from 3400 to 5400 feet.

This unit makes up about 10 percent of the survey area. It is about 51 percent Maynard Lake soils and 20 percent Stumble soils. The remaining 29 percent is minor soils.

Maynard Lake soils are somewhat excessively drained. They have a loamy sand surface and a gravelly, loamy sand substratum. Carbonates commonly occur at a depth of about 51 inches. Stumble soils are somewhat excessively drained and commonly occur in similar positions as the Maynard Lake soils, but at elevations greater than 4800 feet. The profile is loamy sand throughout.

Minor in this unit are the deep, well-drained Haybourne soils occurring in similar positions on the landscape, the Maynard Lake and Stumble soils overlying welded tuff at 20 to 60-inch depth, and the very shallow to shallow, somewhat excessively drained Coso and Shoken soils on granitic sideslopes.

This unit is used for pumice mines, military reservation, rangeland, and wildlife habitat. It is suited as a source of pumice deposits, which underly the soils of this unit. The main limitations for use as rangeland

include sandy surface textures, low available water capacity, and the hazard of soil blowing.

7. Maynard Lake - Stumble

Very deep, nearly level to strongly sloping, somewhat excessively drained sandy soils; formed in alluvium from rhyolite tuff and volcanic ash deposits

This map unit is on alluvial fans and intermountain valleys and basins of the Coso Range. Elevation ranges from 3900 to 5200 feet. This unit makes up about 8 percent of the survey area. It is about 47 percent Maynard Lake soils and 34 percent Stumble soils. The remaining 19 percent is minor soils.

Maynard Lake soils generally occur at elevations under about 4800 feet. The profile is loamy sand and gravelly loamy sand to depths of 60 inches or more. Carbonates commonly occur at a depth of about 51 inches.

Stumble soils generally occur above about 4800 feet in elevation. The profile is loamy sand to a depth of 60 inches or more.

Minor in this unit are the somewhat excessively drained Dunmovin soils on alluvial fans below granitic uplands, the well-drained Haybourne soils in similar positions and generally above 4800 feet in elevation, and small, internally drained playa areas in basin positions.

This unit is used for military reservation, rangeland, and wildlife habitat. Areas of this unit are used for pumice mining. This unit is suited for use as a source of sand and pumice. The main limitations for rangeland include sandy surface textures, low available water capacity, and the hazard of soil blowing. These limitations affect the soil's potential to produce forage vegetation.

8. Coso - Rock Outcrop

Very shallow to shallow, moderately steep to steep, somewhat excessively drained stony loamy soils; formed in granite; and Rock Outcrop

This map unit is on sideslopes and ridges of the granitic uplands of the Coso Range. Elevation ranges from 3300 to 5900 feet. This unit makes up about 27 percent of the survey area. It is about 31 percent Coso soils and 30 percent rock outcrop. The remaining 39 percent is minor soils.

Coso soils occur on weathered fractured granite. Slope ranges from 15 to 50 percent. The profile is a stony, sandy loam surface layer overlying weathered fractured granite with sandy clay loam in the fractures. The surface contains 30 to 60 percent rock fragments. Rock Outcrop consists of granite and some basic igneous rocks mostly on ridges and upper sideslopes.

Minor in this unit are the shallow, somewhat excessively drained Haiwee soils overlying hard granite, the very shallow to shallow, somewhat excessively drained Shoken soils overlying weathered granite at elevations greater than approximately 4800 feet, the moderately deep Coso Variant soils on talus and colluvial toeslopes, and the shallow, somewhat excessively drained Haiwee Variant soils occurring on andesite bedrock.

This unit is used for military reservation and wildlife habitat. The soils of this unit are limited for many uses by steep slopes, coarse fragment content, shallow depth, and rock outcrops.

9. Rubble Land - Torriorthents - Rock Outcrop

Moderately deep, steep to very steep, excessively drained stony loamy soils on rhyolite domes; rubble land and rock outcrop

This map unit is on rhyolite domes and rubble land associated with these domes in the Coso Range. The soils formed in well-fractured

rhyolite. Elevation ranges from 3800 to 5600 feet. This unit makes up about 5 percent of the survey area. It is about 35 percent rubble land, 35 percent Torriorthents, and 15 percent rock outcrop. The remaining 15 percent is minor soils.

Rubble land consists of areas with 90 percent or more of the surface covered with stones and boulders. Torriorthents are excessively drained. They formed in residual material weathered from rhyolite, rhyolitic talus, and colluvium. Slope ranges from 30 to 70 percent. The profile is a very stony, sandy loam surface underlain by a very stony and extremely stony loamy sand substratum. Hard rock is at a depth ranging from 20 to 40 inches. Rock outcrop consists of areas on rhyolitic domes with 90 percent or more rock outcrops.

This map unit is used for military reservation. It is limited for most uses by rock outcrops, a very stony surface, and steep slopes.

10. Cinder Land - Lava Flows

This map unit is comprised of basaltic cinder cones and lava flows mainly in the southern portion of the survey area. Elevation ranges from 3600 to 5350 feet. This unit makes up about 3 percent of the survey area. It is about 42 percent lava flows, and 37 percent cinder land. The remaining 21 percent is minor soils.

Cinder land consists of volcanic cinder cones with cinder deposits on their flanks. Slope ranges from 30 to 75 percent. The cinder deposits consist of gravel-sized cinders to a depth of 60 inches or more. Lava flows consists of jagged outcrops of dark colored basalt. Slope ranges from 5 to 30 percent.

Minor in this unit are the shallow, somewhat excessively drained Lithic Torripsamments occurring as wind-blown sands overlying the lava flows, and the shallow, well-drained Sparkhule soils forming in the cinder deposits.

This unit is used for military reservation and wildlife habitat.

This unit is suited for use as a source of cinders. The content of coarse fragments, rock outcrops, and steep slopes limits this unit for many uses.

6.0 DETAILED SURVEY IDENTIFICATION LEGEND AND DESCRIPTION OF SOIL MAP UNITS

Table 6-1 presents the detailed survey identification legend to accompany the 1:24,000 scale soils map (Plate 2). Nontechnical descriptions of the soil mapping units follow a summary of unit descriptions in the Genetic Key to Soils (Table 6-2). Detailed series descriptions of the constituent soils are presented in Appendix A, Soil Series Technical Descriptions.

The following map unit descriptions include three kinds of map units:

1. Soil Consociations

The soils in this type of map unit occur in well-defined landscapes in which there is little variability or inclusions. Consequently, they have been delineated as single soil phases, and are considered 80% to 90% pure. The map unit is named for the predominant series and phase present.

2. Soil Complex Map Unit

This map unit consists of two or more soils which occur together in such an intricate pattern that separate delineation was not practical at the scale used.

3. Soil Association Map Unit

This map unit consists of a group of soils which occur together in an individual characteristic pattern over a geographic area. Contrasting soils (such as soils with contrasting depths or textures) which occur in a definitive position in the landscape (alluvial fan vs ridgetop) were separated by photo-interpretive and field reconnaissance techniques.

Most of the map units presented are poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by lack of adequate precipitation. In the lower elevation thermic soils, sparse vegetation and low forage yields are a result of the low

precipitation. The higher elevation mesic soils receive slightly more precipitation and may potentially constitute better range sites. Nevertheless, most of the soils support sparse stands of plants that are suitable for grazing. Proper grazing use (including proper stocking) is a recommended management practice.

TABLE 6-1. IDENTIFICATION LEGEND AND MAP SYMBOLS - DETAILED SURVEY

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
155	Arizo very bouldery loamy sand, 2 to 5 percent slopes	80	315
	Inclusions:		
	Dunmovin bouldery loamy coarse sand	15	
	Other soils	5	
223	Cinder land, steep	95	845
	Inclusions:		
	Rock outcrop (basalt)	5	
130	Coso - Rock outcrop - Haiwee complex, 30 to 50 percent slopes		11,901
	Coso stony sandy loam, 30 to 50 percent slopes	40	
	Rock outcrop (granitic)	30	
	Haiwee very stony sandy loam, 30 to 50 percent slopes	15	
	Inclusions:		
	Coso Variant	5	
	Typic Haplargids, fine, mixed, thermic	5	
	Typic Camborthids, loamy-skeletal, mixed, thermic	5	
131	Coso - Rock outcrop - Coso Variant association, steep		3,488
	Coso stony sandy loam, 15 to 50 percent slopes	40	
	Rock outcrop	30	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
131 (contd)	Coso - Rock outcrop - Coso Variant association, steep (Continued)		
	Coso Variant very stony sandy loam, 15 to 30 percent slopes	15	
	Inclusions:		
	Haiwee very stony sandy loam	10	
	Typic Haplargids, fine, mixed, thermic Typic Camborthids, loamy-skeletal, mixed, thermic	5	
105	Dunmovin loamy coarse sand, 0 to 5 percent slopes	80	12,317
	Inclusions:		
	Typic Torriorthents, coarse-loamy, mixed, thermic	10	
	Lavic loamy sand	10	
106	Dunmovin loamy, coarse sand, 5 to 9 percent slopes	80	1,203
	Inclusions:		
	Dunmovin bouldery loamy coarse sand	10	
	Arizo gravelly loamy sand	5	
	Dunmovin Variant loamy sand	5	
104	Dunmovin bouldery loamy coarse sand, 5 to 9 percent slopes	80	2,150
	Inclusions:		
	Dunmovin gravelly loamy coarse sand	10	
	Arizo gravelly loamy sand	10	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
108	Dunmovin - Lavic complex, 0 to 2 percent slopes		584
	Dunmovin loamy coarse sand, 0 to 2 percent slopes	70	
	Lavic loamy sand, 0 to 2 percent slopes	20	
	Inclusions:		
	Riverwash	5	
	Typic Torriorthents, coarse-loamy mixed thermic	5	
181	Dunmovin Variant - Nebona Variant - Alko Variant complex, 2 to 9 percent slopes		3,164
	Dunmovin Variant loamy sand, 2 to 9 percent slopes	50	
	Nebona Variant cobbly loamy sand, 2 to 9 percent slopes	20	
	Alko Variant cobbly loamy sand, 2 to 9 percent slopes	20	
	Inclusions:		
	Joshua Variant sandy loam	5	
	Dunmovin loamy coarse sand	5	
101	Garlock cobbly loamy coarse sand, 9 to 15 percent slopes	85	113
	Inclusions:		
	Dunmovin bouldery loamy coarse sand	15	
120	Garlock Variant - Dunmovin - Rock outcrop association, rolling		2,174
	Garlock Variant cobbly loamy sand, 5 to 15 percent slopes	40	
	Dunmovin coarse sand, 5 to 15 percent slopes	25	
	Rock outcrop	15	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
120	Inclusions:		
	Typic Haplargids, fine-loamy mixed thermic	10	
	Unnamed soil (up to 24 inches sand over Typic Haplargids)	10	
121	Garlock Variant - Dunmovin association, rolling		453
	Garlock Variant cobbly loamy sand, 5 to 15 percent slopes	60	
	Dunmovin loamy coarse sand, 5 to 15 percent slopes	25	
	Inclusions:		
	Typic Haplargids fine-loamy mixed thermic	10	
	Basalt Rock outcrop	5	
220	Gass Variant - Garlock Variant complex, 5 to 15 percent slopes		1,747
	Gass Variant cobbly fine sandy loam, 5 to 15 percent slopes	50	
	Garlock Variant cobbly loamy sand, 5 to 15 percent slopes	25	
	Inclusions:		
	Basalt Rock outcrop	15	
	Sparkhule cobbly loamy sand	10	
170	Haybourne loamy sand, 5 to 15 percent slopes	85	835
	Inclusions:		
	Shoken stony sandy loam	10	
	Stumble loamy coarse sand	5	
182	Hooten Variant bouldery loamy fine sand, 5 to 15 percent slopes	85	251

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
182	Inclusions:		
	Dunmovin bouldery loamy coarse sand	10	
	Hooten Variant loamy fine sand	5	
183	Hooten Variant loamy fine sand, 5 to 9 percent slopes	85	249
	Inclusions:		
	Dunmovin loamy coarse sand	10	
	Hooten Variant bouldery loamy fine sand	5	
190	Joshua Variant - Nebona Variant complex, 2 to 30 percent slopes		675
	Joshua Variant sandy loam	60	
	Nebona Variant cobbly loamy sand	20	
	Inclusions:		
	Alko Variant cobbly loamy sand	10	
	Dunmovin loamy coarse sand	10	
150	Joshua Variant - Arizo - Lavic complex, 2 to 5 percent slopes		671
	Joshua Variant sandy loam, 2 to 5 percent slopes	45	
	Arizo very bouldery loamy sand, 2 to 5 percent slopes	25	
	Lavic loamy sand, 2 to 5 percent slopes	20	
	Inclusions:		
	Nebona Variant	5	
	Alko Variant	5	
222	Lava flows - Lithic Torripsamments complex, 5 to 30 percent slopes		1,332
	Lava flows	70	
	Lithic Torripsamments, mixed, thermic	20	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
222	Inclusions:		
	Sparkhule stony loamy fine sand	10	
107	Lavic - Dunmovin - Playa association, nearly level		2,121
	Lavic loamy sand, 0 to 2 percent slopes	50	
	Dunmovin loamy coarse sand, 0 to 2 percent slopes	20	
	Playa	15	
	Inclusions:		
	Typic Camborthids, loamy-skeletal, mixed, thermic	10	
	Typic Torriorthents, fine-silty, mixed, thermic	5	
141	Maynard Lake loamy coarse sand, 15 to 30 percent slopes	80	3,142
	Inclusions:		
	Maynard Lake loamy coarse sand (over-welded tuff at 40 to 60 inches depth)	15	
	Coso stony sandy loam	5	
142	Maynard Lake loamy coarse sand, 2 to 15 percent slopes	80	3,397
	Inclusions:		
	Dunmovin loamy coarse sand	20	
140	Maynard Lake loamy coarse sand, 30 to 50 percent slopes	80	1,813
	Inclusions:		
	Maynard Lake loamy coarse sand (over welded tuff at 20 to 60 inches depth)	15	
	Coso stony sandy loam	5	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
133	Maynard Lake - Coso complex, 15 to 30 percent slopes		362
	Maynard Lake loamy coarse sand, 15 to 30 percent slopes	50	
	Coso stony sandy loam, 15 to 30 percent slopes	40	
	Inclusions:		
	Rock outcrop	5	
	Maynard Lake loamy coarse sand (over-welded tuff at 20 to 60 inches depth)	5	
180	Nebona Variant - Alko Variant cobbly loamy sands, 5 to 30 percent slopes		4,631
	Nebona Variant cobbly loamy sand, 5 to 30 percent slopes	30	
	Alko Variant cobbly loamy sand, 5 to 30 percent slopes	30	
	Inclusions:		
	Dunmovin cobbly loamy sand, 2 to 9 percent slopes	10	
	Joshua Variant	10	
	Torriorthents cobbly loamy sands	10	
	Hardpans at less than 8 inches depth	10	
110	Playa	100	138
111	Riverwash	80	214
	Inclusions:		
	Torrifluvents	10	
	Torriorthents	10	

TABLE 6-1 (Continued)

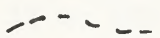
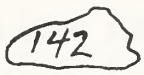
Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
232	Rock outcrop - Haiwee Variant complex, 30 to 50 percent slopes		879
	Rock outcrop	45	
	Haiwee Variant very stony loam, 30 to 50 percent slopes	35	
	Inclusions:		
	Typic Torriorthents, loamy-skeletal, mixed, mesic	15	
	Stumble loamy coarse sand (over andesitic tuff at 20 to 60 inches depth)	5	
160	Rubble land - Torriorthents - Rock outcrop complex, 30 to 75 percent slopes		3,895
	Rubble land	35	
	Torriorthents	35	
	Rock outcrop	15	
	Inclusions:		
	Maynard Lake loamy coarse sand (over welded tuff at 20 to 60 inches depth)	15	
234	Shoken-Rock outcrop association, steep Shoken stony sandy loam, 30 to 50 percent slopes	40	3,302
	Rock outcrop	35	
	Inclusions:		
	Lithic Torriorthents, loamy-skeletal, mixed, mesic	15	
	Typic Haplargids, fine, mixed, mesic	5	
	Typic Camborthids, loamy-skeletal, mixed, mesic	5	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
221	Sparkhule - Lava flows complex, 5 to 30 percent slopes		727
	Sparkhule very stony loamy fine sand, 5 to 30 percent slopes	65	
	Lava flows	20	
	Inclusions:		
	Lithic Torripsamments	10	
	Garlock Variant cobbly loamy sand	5	
241	Stumble loamy coarse sand, 15 to 30 percent slopes	80	707
	Inclusions:		
	Stumble loamy coarse sand (over welded tuff at 40 to 60 inches depth)	15	
	Shoken stony sandy loam	5	
242	Stumble loamy coarse sand, 2 to 15 percent slopes	85	2,318
	Inclusions:		
	Haybourne loamy sand, 2 to 15 percent slopes	10	
	Playa	5	
240	Stumble loamy coarse sand, 30 to 50 percent slopes	80	1,248
	Inclusions:		
	Stumble loamy coarse sand (over welded tuff at 20 to 60 inches depth)	15	
	Shoken stony sandy loam	5	
233	Stumble-Shoken complex, 15 to 30 percent slopes		460
	Stumble loamy coarse sand, 15 to 30 percent slopes	50	

TABLE 6-1 (Continued)

Symbol	Soil Mapping Unit	Percent	Acreage of Map Unit
233 (cont'd)	Shoken stony sandy loam, 15 to 30 percent slopes	40	
	Inclusions:		
	Rock outcrop	5	
	Stumble loamy coarse sand (over welded tuff at 20 to 60 inches depth)	5	
135	Wasco Variant very fine sandy loam, 0 to 2 percent slopes	80	1,270
	Inclusions:		
	Dunmovin loamy coarse sand	10	
	Lavic loamy sand	10	

Conventional & Special Symbols	Description
	Trail
	Soil Delineations and Soil Symbols
	Bedrock Escarpment
	Mine or Quarry
	Spring
	Well, irrigation
	Depression or Sink
	Soil Sample Site
	Rock Outcrop
	Saline Spot
	Sandy Spot
	Slide or Slip
	Livestock Watering Trough
	Gravel
	Bouldery Area

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (> 3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
241	Stumble loamy coarse sand, 15 to 30% slopes										
	Stumble LCOS (80%)	15-30	Typic Torripsamments, mixed, mesic	ochric none	rhyolitic tuff, volcanic ash	upland side-slopes	60"	nonstony	somewhat excessively	creosote bush, cheesebush, allscale, Joshua tree, copper goldenbush	nonsaline moderately alkaline
242	Stumble loamy coarse sand, 2 to 15% slopes										
	Stumble LCOS (85%)	2-15	Typic Torripsamments, mixed,mesic	ochric none	alluvium from rhyolitic tuff, volcanic ash	upland high elevation valleys	60"+	nonstony	somewhat excessively	creosote bush, cheesebush, allscale, Joshua tree	nonsaline moderately alkaline
240	Stumble loamy coarse sand, 30 to 50% slopes										
	Stumble LCOS (80%)	15-30	Typic Torripsamments, mixed, mesic	ochric none	rhyolitic and andesitic tuff, volcanic ash	high elevation upland side-slopes	60"	nonstony	somewhat excessively	creosote bush, cheesebush, allscale, Joshua tree, copper goldenbush	nonsaline moderately alkaline
233	Stumble - Shoken complex, 15 to 30% slopes										
	Stumble LCOS (50%)	15-30	Typic Torripsamments, mixed,mesic	ochric none	rhyolitic and andesitic tuff, volcanic ash	high elevation recent alluvial fans & uplands	60"	nonstony	somewhat excessively	creosote bush, Joshua tree, burrowbrush	nonsaline moderately alkaline
	Shoken ST-SL (40%)	15-30	Xeric Torriorthents, loamy-skeletal, mixed, nonacid, mesic, shallow	ochric none	granite and granitic	mountainous uplands above approx. 4800 ft. elevation	3-10"	30-45%	well	shadscale, allscale, creosote bush, cheesebush, buckwheat	nonsaline mildly alkaline
135	Wasco Variant VFSL (80%)	0-2	Durorthidic Torriorthent, coarse-loamy, mixed, thermic	ochric none	mixed alluvium	lower valley fill	15-20" to weak pan	nonstony	moderately well	shadscale, allscale, buckwheat, spiny sage, cheatgrass, cholla	nonsaline moderately alkaline

Table 6-2 Genetic Key to Soils

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (> 3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
232	Rock Outcrop - Haiwee Variant complex, 30 to 50% slopes										
	Rock outcrop (45%)	30-50			andesite	mountainous uplands					
	Haiwee Variant STV-L (35%)	30-50	Lithic, Xeric Torriorthents, loamy-skeletal, mixed, nonacid, mesic	ochric none	andesite	mountainous sideslopes & ridgetops	10-20"	30-50%	somewhat excessively	shadscale, cheesebush, rabbitbush, stipa, burrowbush	nonsaline mildly alkaline
160	Rubbleland - Torriorthents - Rock Outcrop complex, 30 to 75% slopes										
	Rubbleland (35%)	30-75			rhyolite talus & colluvium	rhyolite dome sideslopes		extremely strong			
	Torriorthents (35%)	30-75	Typic Torriorthents, sandy-skeletal, mixed, thermic	ochric none	fractured rhyolite	rhyolite dome sideslopes	20-40"	45-70% surface bounders	excessively	creosote, stipa, allscale, indian rice, burrowbrush, copper goldenbush, rabbitbrush	nonsaline mildly alkaline
	Rock Outcrop (15%)	30-75			rhyolite	rhyolite dome					
234	Shoken - Rock Outcrop association, steep										
	Shoken ST-SL (40%)	30-50	Xeric Torriorthents, loamy-skeletal, mixed, nonacid, mesic, shallow	ochric none	granite and granitic colluvium	mountainous uplands above approx. 4800 ft.elevation	3-10"	30-45%	well	shadscale, allscale, creosote, buckwheat, cheesebush	nonsaline mildly alkaline
	Rock Outcrop (35%)	30-50			granite and basic igneous rocks	mountainous uplands					
221	Sparkhule - Lava flows complex, 5 to 30% slopes										
	Sparkhule STV-LFS (65%)	5-30	Lithic Haplargids, loamy, mixed, thermic	ochric argillic	basalt	basaltic uplands and cinder cones	14-20"	25-50%	well	Creosote, cheesebush, burrowbrush, mormon tea, stipa	nonsaline moderately alkaline
	Lava Flows (20%)	5-30			basalt	lava flow		extremely stony			

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (>3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
140	Maynard Lake loamy coarse sand, 30 to 50% slopes										
	Maynard Lake LCOS (80%)	30-50	Typic Torripsamments, mixed, thermic	ochric none	welded rhyolitic tuff	rhyollitic dome and granitic upland sideslopes and toeslopes	60"	nonstony	somewhat excessively	Creosote bush, cheesebush, coppergolden bush, allscale, winterfat, buckwheat, astragalus	nonsaline mildly to moderately alkaline
133	Maynard Lake - COSO complex, 15 to 30% slopes										
	Maynard Lake LCOS (50%)	15-30	Typic Torripsamments, mixed, thermic	ochric none	alluvium from rhyolite tuff and volcanic ash deposits	upland granitic sideslopes	60"	nonstony	somewhat excessively	Creosote, cheesebush, allscale, coppergolden bush, stipa, indian rice grass	nonsaline mildly to moderately alkaline
	Coso ST-SL (40%)	15-30	Xeric Torriorthents, loamy-skeletal, mixed, nonacid, thermic	ochric none	granite and granitic colluvium	mountainous uplands	7-20"	30-45%	somewhat excessively	Shadscale, allscale, creosote, buckwheat, cheesebush	nonsaline mildly alkaline
180	Nebona Variant - Alko Variant, cobbly, loamy sands, 5 to 30% slopes										
	Nebona Variant CB-LS (30%)	5-30	Typic Durorthids, sandy, mixed, thermic, shallow	ochric duripan	older mixed alluvium	older dissected terrace and alluvial fans	8-15" to pan	5-15%	well	Shadscale, creosote, indian rice grass, burrowbrush, bottlestopper, allscale	nonsaline moderately alkaline
	Alko Variant CB-LS (30%)	5-30	Typic Nadurargids, clayey, montmorillonitic, thermic, shallow	ochric argillic/ Duripan	older mixed alluvium	upper dissected terrace and alluvial fans	8-20" to pan	5-15%	well	Creosote bush, burrowbrush, bottlestopper, mormon tea, goldenbush	nonsaline moderately alkaline
110	Playa (100%)	0-2		ochric none	wind-blown material and older channel alluvium	valley basin	60"+	nonstony	moderately well	shadscale	moderately to strongly saline, mod. to strongly alkaline
111	Riverwash (80%)	0-2		none	recent mixed	floodplain	>72"	1-5%	somewhat excessive to excessive	Creosote, shadscale, cheesebush	nonsaline mildly to moderately alkaline

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (> 3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
222	Lava Flows- Lithic Torripsamments complex, 5 to 30% slopes										
	Lava Flows (70%)	5-30			basalt	lava flow					
	Lithic Torripsamments (20%)	5-30	Lithic Torripsamments, mixed, thermic	ochric / none	aeolian sands over lava	lava flow	8"	85-95%	somewhat excessively	burrowbrush, creosote	nonsaline slightly acid
107	Lavic - Dunmovin - Playa association, 0 to 2% slopes										
	Lavic LS (50%)	0-2	Typic Calciorthid, coarse-loamy, mixed, thermic	ochric / calcic	alluvial valley fill and aeolian material	valley bottom and inter playa flats	60"+	0-5%	well	Allscale, Russian thistle, shadscale, cheesebush, spiny sage	mod. saline strongly alkaline
	Dunmovin LCOS (20%)	0-2	Typic Torripsamments, mixed, thermic	ochric / calcic	younger granitic alluvium	lower alluvial fans	60"+	0-2%	somewhat excessively	Creosote, goldenbush, winterfat, horsebrush	nonsaline mod. alkaline
	Playa (15%)	0-2		ochric / none	wind-blown material and older channel alluvium	valley basin	60"+	nonstony	moderately well	Shadscale	moderately to strongly saline, moderately to strongly alkaline
141	Maynard Lake loamy coarse sand, 15 to 30% slopes										
	Maynard Lake LCOS (80%)	15-30	Typic Torripsamments, mixed, thermic	ochric / none	rhyolitic tuff	lower upland sideslopes	60"	nonstony	somewhat excessively	Creosote, cheesebush, coppergolden bush, allscale, Joshua tree	nonsaline mildly to moderately alkaline
142	Maynard Lake loamy coarse sand, 2 to 15% slopes										
	Maynard Lake LCOS (80%)	2-15	Typic Torripsamments mixed, thermic	ochric / none	rhyolitic tuff	upland valleys and basins	42"	nonstony	somewhat excessively	Joshua tree, creosote, cheesebush, coppergolden bush, allscale	nonsaline mildly to moderately alkaline
	Dunmovin LCOS (20%)	2-15	Xeric Torripsamments mixed, thermic	ochric / none	mixed alluvium	lower alluvial fans	72"	nonstony	somewhat excessively	Joshua tree, creosote, cheesebush, coppergolden bush, allscale	nonsaline mildly to moderately alkaline

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (>3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
170	Haybourne loamy sand, 5 to 30% slopes										
	Haybourne LS (85%)	5-30	Xerollic Camborthids, coarse-loamy, mixed, mesic	mollic intergrade cambic	rhyolite tuff, mixed alluvium	high elevation inter-mountain valleys, basins and swales	60"	nonstony	well	Joshua, elephant brush, horsebrush	nonsaline neutral to mildly alkaline
182	Hooten Variant BY-LFS 5 to 15% slopes (85%)	5-15	Entic Durorthids, loamy-skeletal, mixed, thermic, shallow	ochric duripan	granitic and andesitic colluvium and alluvium	old dissected alluvial fan to pan	8-20"	5-35%	well	Creosote bush, burrowbrush, stipa, bottlestopper, buckwheat, beavertail	nonsaline mildly alkaline
183	Hooten Variant LFS, 5 to 9% slopes (85%)	5-9	Entic Durorthids, loamy-skeletal, mixed, thermic, shallow	ochric duripan	granitic and andesitic alluvium	slightly dissected alluvial fan	8-20" to pan	0-5%	well	Creosote brush, burrowbrush, stipa, bottlestopper, buckwheat, beavertail cactus	nonsaline mildly alkaline
190	Joshua Variant - Nebona Variant complex, 2 to 30% slopes										
	Joshua Variant SL (60%)	2-30	Duric Haplargids, fine-loamy, mixed, thermic	ochric argillic	older granitic alluvium	older dissected fan	9-22" to discontinuous weak pan	2-10%	well	Creosote, cheesebush	nonsaline neutral
	Nebona Variant CB-LS (20%)	2-30	Typic Durorthids, sandy, mixed, thermic, shallow	ochric duripan	older mixed alluvium	older dissected fan	8-15" to pan	5-15%	well	shadscale, creosote, indian rice grass, burrowbrush, bottlestopper, allscale	nonsaline mod. alkaline
150	Joshua Variant - Arizo-Lavic complex 2 to 5% slopes										
	Joshua Variant SL (45%)	2-5	Duric Haplargids, fine-loamy, mixed, thermic	ochric argillic	granitic alluvium	dissected older fan	9-22% to discontinuous weak pan	2-10%	well	Creosote, cheesebush	nonsaline neutral
	Arizo BYV-LS (25%)	2-5	Typic Torriorthents, sandy-skeletal, mixed, thermic	ochric none	recent mixed alluvium	boulder-strewn alluvial fans	60"	35-45%	excessively	Creosote, burrowbrush, cheesebush, horsebrush, allscale	nonsaline moderately
	Lavic LS (20%)	2-5	Typic Calciorthid, coarse-loamy, mixed, thermic	ochric calcic	mixed alluvium and colluvium from granitic & andesitic sources	dissected alluvial fan	60"+	5-10%	well	Allscale, Russian thistle, shadscale, cheesebush, spiny sage	nonsaline mod. alkaline

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (>3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
106	Dunmovin loamy coarse sand, 5 to 9% slopes										
	Dunmovin LCOS (80%)	5-9	Xeric Torripsamments, mixed, thermic	ochric none	younger granitic alluvium	upper alluvial fans	60"	nonstony	somewhat excessively	Creosote, goldenbush, winterfat, horsebrush	nonsaline moderately alkaline
104	Dunmovin bouldery loamy coarse sand, 5 to 9% slopes										
	Dunmovin BY-LCOS (80%)	5-9	Xeric Torripsamments, mixed, thermic	ochric	granitic alluvium	alluvial fans and toeslopes of alluvial fans	60"+	5-10%	somewhat excessively	Creosotebush, rabbitbrush, burrowbrush, shadscale	nonsaline moderately alkaline
108	Dunmovin-Lavic complex, 0 to 2% slopes										
	Dunmovin LCOS (70%)	0-2	Xeric Torripsamments, mixed, thermic	ochric none	younger granitic alluvium	lower alluvial fans	60"+	nonstony	somewhat excessively	Creosote, goldenbush, winterfat, horsebush	nonsaline moderately alkaline
	Lavic LS (20%)	0-2	Typic Calciorthid, coarse-loamy, mixed, thermic	ochric calcic	alluvial valley fill, and aeolian material	valley bottoms and interplaya flats	60"+	0-5%	well	Allscale, Russian thistle, shadscale, cheesebush, spiny sage	moderately saline, strongly alkaline
181	Dunmovin Variant - Nebona Variant - Alko Variant complex, 2 to 9% slopes										
	Dunmovin Variant LS (50%)	2-9	Durorthidic Torripsamments, mixed, thermic	ochric none	mixed alluvium	inter-terrace swales and alluvial fans	35-40" to weak pan	nonstony	somewhat excessively	Cholla cactus, Joshua tree, allscale, shadscale, winterfat, copper goldenbush	nonsaline mildly alkaline
	Nebona Variant LS (20%)	2-9	Typic Durorthids, sandy, mixed, thermic, shallow	ochric duripan	older mixed alluvium	older slightly dissected terrace	8-20" to pan	nonstony	well	Cholla cactus, Joshua tree, allscale, shadscale, winterfat, coppergolden bush	nonsaline moderately alkaline
	Alko Variant LS (20%)	2-9	Typic Nadurargids, clayey, montomorillonitic, thermic, shallow	ochric argillic/ duripan	older mixed alluvium	older slightly dissected terrace	8-20" to pan	nonstony	well	Cholla cactus, Joshua tree, allscale, shadscale, winterfat, coppergolden bush	nonsaline moderately alkaline

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface & Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (>3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
101	Garlock cobbly loamy coarse sand, 9 to 15% slopes CB-LCOS (85%)	9-15	Typic Haplargids, fine-loamy, mixed, thermic	ochric argillic	granitic alluvium	upper old dissected fan	60"	5-10%	well	Creosote bush, rabbitbrush, CA buckwheat	nonsaline mod. alkaline to neutral
	Dunmovin BY-LCOS (15%)	9-15	Xeric Torripsamments, mixed, thermic	ochric none	granitic alluvium	interfan drainageways	60"+	5-10%	somewhat excessively	Crosote bush, rabbitbrush, shadscale, burrowbrush	nonsaline mod.alkaline
120	Garlock Variant - Dunmovin - Rock Outcrop association, rolling										
	Garlock Variant CB-LS (40%)	5-15	Typic Haplargids, fine, montmorillonitic, thermic	ochric argillic	volcanic cinders and basalt	basalt flows and cinder deposits	26-40"	10-20%	well	Allscale, spiny sage, cheesebush, shadscale	nonsaline mildly alkaline
	Dunmovin COS (25%)	5-15	Xeric Torripsamments, mixed, thermic	ochric none	wind-blown sands	stabilized sand dunes	60"	0-2%	excessively	Joshua, cheesebush, mormon tea, winterfat, indian rice grass	nonsaline mod.alkaline
	Rock Outcrop (15%)				basalt	small jagged outcrops					
121	Garlock Variant - Dunmovin association, rolling										
	Garlock Variant CB-LS (60%)	5-15	Typic Haplargids, fine, montmorillonitic,	ochric argillic		basalt	26-40"	10-20%	well	Allscale, spiny cheesebush, shadscale	nonsaline mildly alkaline
	Dunmovin LCOS (25%)	5-15	Xeric Torripsammments, mixed, thermic	ochric none	recent alluvium and windblown sands	stabilized sand dunes, alluvial fan	60"	nonstony	somewhat excessively	Creosote, goldenbush, winterfat, horsebrush	nonsaline mod.alkaline
220	Gass Variant - Garlock Variant complex, 5 to 15% slopes										
	Gass Variant CB-FSL (15%)	5-15	Typic Natrargids, fine, montmorillonitic, thermic	ochric argillic, natric	basalt	upland mesa basalt flow	20-40"	10-45%	well	allscale, cheesebush, bottlestopper, creosote, mint	strongly saline, mod.alkaline
	Garlock Variant CB-LS (25%)	5-15	Typic Haplargids, fine, montmorillonitic, thermic	ochric argillic	basalt	upland mesa basalt flow	26-40"	10-20%	well	Cheatgrass, shadscale, cheesebush	nonsaline mildly alkaline

Table 6-2 (Cont.)

Map Unit Symbol	Soil Series (1)	Slope %	Soil Family	Diagnostic Surface and Subsurface Horizons	Parent Material	Landform	Effective Soil Depth	Degree of Surface Stoneness (> 3" Dia.)	Drainage Class	Associated Vegetation	Salinity Reaction
155	Arizo very bouldery loamy sand, 5 to 30% slopes (80%)	5-30	Typic Torriorthents, sandy-skeletal, mixed, thermic	ochric none	Bouldery granitic and andesitic alluvium	Alluvial valleys and drainageways	60"	35-45%	Excessively	Creosote bush, burrowbrush, horsebrush, allscale, cheesebush	nonsaline Moderately Alkaline
223	Cinder land	steep 30-75			Volcanic cinders	cinder cones and deposits					
130	Coso-Rock Outcrop-Haiwee complex, 30 to 50% slopes										
	Coso ST-SL (40%)	30-50	Xeric Torriorthent, loamy-skeletal, mixed, nonacid, thermic, shallow	ochric none	Granite and granitic colluvium	mountainous uplands	7-20"	30-45%	Somewhat excessively	Shadscale, allscale, creosote, buckwheat, cheesebush	nonsaline mildly alkaline
	Rock Outcrop (30%)	30-50			granite	mountainous uplands					
	Haiwee STV-SL (15%)	30-50	Lithic Xeric Torriorthents, loamy-skeletal, mixed, nonacid, thermic	ochric none	granite	mountainous uplands	8-20"	20-35%	Somewhat excessively	Shadscale, cheesebush, rabbitbrush, burrowbrush, stipa	nonsaline moderately alkaline
131	Coso-Rock Outcrop-Coso Variant association, 15 to 50% slopes										
	Coso ST-SL (40%)	15-50	Xeric Torriorthent, loamy-skeletal, nonacid, mixed, thermic, shallow	ochric none	granite and granitic colluvium	mountainous uplands	7-20"	30-45%	Well	Shadscale, allscale, creosote, buckwheat, cheesebush	nonsaline mildly alkaline
	Rock Outcrop (30%)				granite	mountainous upland					
	Coso Variant STV-SL (15%)	15-50	Xeric Torriorthents, nonacid, loamy/skeletal, mixed, thermic	ochric none	granite colluvium	sideslopes and toeslopes of	20-60"	40-50%	Well	Creosote, shadscale, stipa, buckwheat	nonsaline mildly alkaline
105	Dunmovin loamy coarse sand, 0 to 5%	0-5	Xeric Torripsamments, mixed, thermic	ochric none	younger granitic alluvium	lower alluvial fans and plains	72"	nonstony	Somewhat excessively	Creosote bush, goldenbush, winterfat, horsebrush	nonsaline moderately alkaline

Table 6-2 (Cont.)

DESCRIPTION OF SOIL MAP UNITS

155 -- Arizo very bouldery loamy sand, 2 to 5 percent slopes. This deep, excessively drained soil is on lower elevation boulder-strewn valleys of the Coso Range. It formed in mixed bouldery granitic and andesitic alluvium. Areas are narrow and elongated in shape and are 48 to 128 acres in size. Many areas are dissected by shallow drainageways. The vegetation consists of desert shrubs, grasses, and forbs. Elevation ranges from 3850 to 4600 feet. The annual precipitation is about 5 to 6 inches. The average air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is brown very bouldery loamy sand about 5 inches thick. The underlying material to a depth of 60 inches is pale brown and light yellowish brown, very bouldery loamy coarse sand. Boulder and stone surface cover is 35 to 45 percent.

Included with this unit are small areas of Dunmovin bouldery loamy sand comprising about 15 percent of the total acreage. Also included is about 5 percent Riverwash and other soils.

Permeability of the Arizo soil is very rapid. Available water capacity is 1.8 to 3.0 inches to a depth of 60 inches. Effective rooting depth is 60 inches and more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for rangeland and wildlife habitat. It is poorly suited for rangeland. The production of vegetation suitable for livestock grazing is limited by a bouldery and sandy surface. Soil blowing resulting in soil loss and deterioration of the existing vegetation results if adequate cover is removed. Livestock management is limited to proper grazing use. The characteristic plant associations on the Arizo soil are Rabbit Bush, Burro weed, and Cresote bush.

Capability Subclass: VIIs
Storie Index: 9

223 -- Cinder land, steep. This map unit consists of volcanic cinder cones and cinder deposits on their flanks. The slope is 30 to 75 percent. Areas are irregular to round in shape and are 100 to 460 acres in size. The natural vegetation consists of sparse annual grasses, forbs, and a few desert shrubs. Elevation is 3400 to 5350 feet. The average annual precipitation ranges from 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the unit consists of gravel-sized cinders to a depth of 60 inches or more.

Included with this unit are small areas of basalt rock outcrops making up about 5 percent of the total acreage. Permeability of the cinders is very rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow,and the hazard of water erosion is slight.

Areas of this unit are used for the mining of cinder deposits. Principal value of this unit is for cinder block manufacture and road building material.

This unit is not suited for use as rangeland. It is limited by steep slopes and shallow rootingdepth. It is impractical to overcome these limitations.

	Capability Subclass	Storie Index
Cinder land, steep	VIIIs	Not rated

130 -- Coso - Rock outcrop - Haiwee complex, 30 to 50 percent slopes. This complex consists of steeply sloping soils on uplands overlying granite bedrock. Areas are irregular in shape and are 20 to 5880 acres in size. The natural vegetation is mainly desert shrubs, grasses, and forbs. Elevation is 3600 to 4800 feet. The annual precipitation is about 6 to 7 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

This complex is 40 percent Coso stony sandy loam, 30 percent Rock outcrop, and 15 percent Haiwee very stony sandy loam. Coso soils overlie weathered, fractured granite bedrock, and the Haiwee soils overlie hard, fractured granite and some basic igneous rocks at 8 to 20 inches depth. Rock outcrop consists of granite and some basic igneous bedrock, mostly on ridgetops and upper sideslopes. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are small areas of Coso Variant soils on talus and colluvial toeslopes. Also included are fine, mixed, thermic Typic Haplargids on upland bench positions, and loamy-skeletal, mixed, thermic Typic Camborthids intermingled with the soils of this complex. Included areas make up about 15 percent of the total acreage.

The Coso soil is shallow to very shallow and somewhat excessively drained. It formed in residual material weathered from granite. Typically, the surface layer is pale brown stony sandy loam about 8 inches thick. The substratum is weathered fractured granite with loamy sand, sandy loam, or sandy clay loam in fractures to a depth of 60 inches.

Permeability of the Coso soil is moderately rapid. Available water capacity is 1.0 to 1.4 inches to a depth of 20 inches. Effective rooting depth is 8 to 20 inches, with some roots in fractures to a depth of 40 inches and more. Runoff is medium to rapid and erosion hazard by water is high.

The Haiwee soil is shallow and somewhat excessively drained. It formed in granite and andesite bedrock. Typically, the surface layer is pale brown very stony sandy loam about 2 inches thick. The substratum is light yellowish brown very stony sandy loam about 8 inches thick. Hard fractured granite bedrock is at about 10 inches depth. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Haiwee soil is moderately rapid, and available water capacity is 0.8 to 1.2 inches to bedrock. Effective rooting depth is 8 to 20 inches. Runoff is medium to rapid, and erosion hazard by water is high.

This mapping unit is used for range, wildlife habitat, and military reservation.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by shallow depth, steep slopes, and surface stoniness. Steep slopes are difficult for cattle to graze, and grazing may result in erosion and soil loss. Adequate cover should be left on the soil. Steep escarpments and rock outcrops occur in this unit. The characteristic plant associations on this unit are Creosote bush, Rabbit Bush, and Burro weed.

Capability Subclass	Storie Index
VIIe nonirrigated	6

131 -- Coso - Rock outcrop - Coso Variant association, steep. This map unit is on granitic uplands and colluvial deposits washed down from granite rocks. Slopes are steep. Areas are irregular in shape and are 22 to 2021 acres in size. The natural vegetation is mainly desert shrubs, grasses, and forbs. Drainageways vary from shallow to deep, depending on hardness of the underlying bedrock, and they are randomly spaced. Elevation is 3400 to 4800 feet. The annual precipitation is about 6 to 7 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

This association is 40 percent Coso stony sandy loam, 15 to 50 percent slopes, 30 percent Rock outcrop, and 15 percent Coso Variant very stony sandy loam, 15 to 30 percent slopes. Coso soils overlie weathered, fractured granite bedrock. Rock Outcrop consists of granite and some basic igneous bedrock mostly on ridgetops and upper sideslopes. Coso Variant soils are forming in talus and colluvial deposits on toeslopes of granitic uplands.

Included in this association is 10 percent Haiwee very stony sandy loam overlying hard, fractured granite. Also included are small areas of fine, mixed, thermic Typic Haplargids on upland bench positions, and small areas of loamy-skeletal, mixed, thermic Typic Camborthids intermingled with the soils of this complex.

The Coso soil is shallow to very shallow and somewhat excessively drained. It formed in residual material weathered from granite. Typically, the surface layer is pale brown stony sandy loam about 8 inches thick. The substratum is weathered fractured granite with loamy sand, sandy loam, or sandy clay loam in fractures to a depth of 60 inches.

Permeability of the Coso soil is moderately rapid. Available water capacity to a depth of 20 inches is 1.0 to 1.4 inches. Effective rooting depth is 8 to 20 inches, with some roots in fractures to a depth of 40 inches or more. Runoff is medium to rapid and erosion hazard by water is high.

The Coso Variant soils are moderately deep and well drained. It formed in granitic talus and colluvium. Typically, the surface layer is pale brown very stony sandy loam about 3 inches thick. The substratum is yellowish brown to light yellowish brown very stony loam about 29 inches thick. The underlying material to a depth of 60 inches is light yellowish brown, weathered granite that crushes to loamy coarse sand. Stone and cobble content of the soil is 40 to 50 percent.

Permeability of the Coso Variant soil is moderate. Available water capacity is 1.6 to 2.4 inches to a depth of 20 to 40 inches. Effective rooting depth is 20 to 40 inches. Runoff is medium and the hazard of water erosion is moderate.

This association is used for range, wildlife habitat, and military reservation. It is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by steep slopes and surface stoniness. Steep and stony slopes are difficult for cattle to graze, and removal of plant cover may induce erosion, resulting in soil loss. Adequate plant cover should be left on the soil. Steep escarpments and rock outcrops occur in this unit. The characteristic plant associations on this unit are Burro weed, Rabbit Bush, and Creosote bush.

Capability subclass	Storie Index
VIIe nonirrigated	6

105 -- Dunmovin loamy coarse sand, 0 to 5 percent slopes. This deep, somewhat excessively drained, sandy soil is on partially dissected alluvial fans, valley floors, narrow drainageways of the upper more strongly dissected alluvial fans, and on wind-blown sands over cinder deposits and basalt flows. It formed in alluvium from mostly granitic sources and in wind-blown sand deposits. Areas are irregular in shape and are 48 to 6526 acres in size. Many areas are dissected by shallow, widely spaced drainageways. The vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 2900 to 3600 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is pale brown loamy coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy coarse sand. The soil is commonly calcareous below a depth of about 29 inches.

Included with this unit are coarse-loamy, mixed, thermic Typic Torriorthents intermingled with the soils of this unit. Also included are areas of Lavic loamy sand in small playa-like depressions. Included areas each comprise about 10 percent of the total acreage.

Permeability of this Dunmovin soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow to slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

Most areas of this unit are used for range and wildlife habitat. A small area in the northern part of Rose Valley is used for irrigated crops. Alfalfa is the main crop. A few areas are in military reservation.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures on the Dunmovin soil. Soil blowing resulting in soil loss and deterioration of the existing vegetation is a possibility if adequate cover is not left on the soil. The characteristic plant associations are Shadscale, Allscale, Burro weed, Rabbit Bush, and Creosote bush.

This unit is suited for irrigated crops. The main limitations are low available water capacity, sandy surface texture, and hazard of soil blowing. Sprinkler irrigation is the most suitable method of applying water. Because these soils are droughty, light and frequent applications of irrigation water are needed. Water should be applied in amounts sufficient to wet the root zone, but in amounts small enough to minimize leaching of plant nutrients. Where used for irrigated alfalfa, soil blowing can be reduced during the seeding operation by planting a cover crop and by keeping the surface layer moist. Alfalfa responds to phosphorous fertilizer.

Capability Subclass	Storie Index
IIIe, irrigated; VIIe, nonirrigated	67

106 -- Dunmovin loamy, coarse sand, 5 to 9 percent slopes. This deep, somewhat excessively drained, sandy soil is on moderately dissected, somewhat older alluvial fans of Rose Valley and the Coso Range. It formed in alluvium of granitic origin. Areas are irregular in shape and are 28 to 712 acres in size. Areas are dissected by shallow to moderately deep, moderately spaced drainageways. The vegetation is mainly desert shrubs, grasses, forbs, and a few Joshua trees. Elevation ranges from 3600 to 5200 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is pale brown loamy coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy coarse sand. The soil is commonly calcareous below a depth of about 29 inches.

Included with this unit is Dunmovin bouldery loamy coarse sand on upper alluvial fans near granitic uplands, which comprises about 10 percent of the total acreage. Also included are small areas of Arizo gravelly, loamy sand in drainageways, and small areas of Dunmovin Variant loamy sand in lower positions on the alluvial fans.

Permeability of this Dunmovin soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This mapping unit is used for range, wildlife habitat, and military reservation. It is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures. Soil blowing resulting in soil loss and deteriorization of the existing vegetation occurs if this soil is overgrazed. Adequate vegetative cover should be left on the soil. Proper stocking is a management practice suitable for use on this unit. The characteristic plant associations on this soil are Burro weed, Mixed Desert Scrub, Creosote bush and Joshua tree.

Capability Subclass: VIIe nonirrigated

Storie Index: 63

104 -- Dunmovin bouldery loamy coarse sand, 5 to 9 percent slopes. This deep, somewhat excessively drained bouldery soil is on dissected, higher lying alluvial fans and toeslopes of the Sierra Nevada. It formed in alluvium of predominantly granitic origin. This unit has a 5 to 10 percent surface cover of boulders. This soil occurs mainly in one large, continuous body of about 2010 acres along the western side of the survey area. The soil is dissected by shallow to moderately deep, moderately spaced drainageways. The vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3500 to 3900 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

Typically, the surface layer is pale brown bouldery loamy coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy coarse sand. Gravel content of the soil is 5 to 15 percent, and surface boulder and cobble cover is 5 to 10 percent.

Included with this unit are areas of Arizo gravelly, loamy sand occurring predominantly in drainageways. Also included is Dunmovin gravelly, loamy sand occurring on lower elevation positions of the fan and lacking the surface boulders. Included areas each comprise about 10 percent of the total acreage.

Permeability of this Dunmovin soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a bouldery surface and sandy surface textures. Soil blowing may result in soil loss

and deterioration of the existing vegetation. Adequate vegetative cover should be left on this soil to minimize the hazard of soil blowing. The characteristic plant associations on this unit are Burro weed, Rabbit Bush, Allscale, and Creosote bush.

Capability Subclass: VIIe nonirrigated

Storie Index: 18

108 -- Dunmovin - Lavic complex, 0 to 2 percent slopes. This complex is on lower alluvial fans of Rose Valey and Coso Basin. The soils occur in narrow elongated bodies from 25 to 336 acres in size. The natural vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3400 to 4100 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 70 percent Dunmovin loamy coarse sand and 20 percent Lavic loamy sand. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Riverwash occurring adjacent to stream channels, and small areas of coarse-loamy, mixed, thermic Typic Torriorthents intermingled with the soils of this complex. Included areas each comprise about 5 percent of the total acreage.

The Dunmovin soil is deep and somewhat excessively drained. It formed in alluvium of predominantly granitic origin. Typically, the surface layer is pale brown loamy coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy coarse sand. The soil is commonly calcareous below a depth of about 29 inches.

Permeability of the Dunmovin soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Lavic soil is deep, well-drained, and variably stratified. It formed in alluvial valley fill. Typically, the surface layer is pale brown loamy sand about 5 inches thick. The subsurface layer is light yellowish brown heavy sandy loam about 11 inches thick. The subsoil is

yellowish brown sandy loam about 4 inches thick. The substratum consists of very pale brown and pale brown stratified loam, loamy fine sand, and very gravelly coarse sand. The soil is calcareous below a depth of about 5 inches.

Permeability of the Lavic soil is moderate, and available water capacity is 6.75 to 7.75 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Lavic soil is moderately saline in the substratum below about 20 inches in depth.

This complex is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures. Soil blowing results in soil loss and deterioration of the existing vegetation. Adequate vegetative cover should be left on this unit, and proper grazing use is recommended. In Coso Basin, this complex is adjacent to a stream channel. The characteristic plant associations on this unit are Rabbit Bush, Burro weed, and Four-winged Saltbush.

Capability Subclass	Storie Index
VIIe nonirrigated	69

181 -- Dunmovin Variant - Nebona Variant - Alko Variant complex, 2 to 9 percent slopes. This complex is on somewhat older dissected alluvial fans of Rose Valley. Dunmovin Variant soils have a weakly cemented horizon at depths varying from 35 to 40 inches, and Alko Variant and Nebona Variant soils have an indurated silica-cemented hardpan at 8 to 20 inches depth. The soils are slightly to moderately dissected by widely spaced drainageways. Areas are irregular in shape and are 148 to 2774 acres in size. The natural vegetation is desert shrubs, grasses, forbs, and some Joshua trees. Elevation is 3400 to 3800 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 50 percent Dunmovin Variant loamy sand, 20 percent Nebona Variant cobbly loamy sand, and 20 percent Alko Variant cobbly loamy sand. Dunmovin Variant soils occur on slightly older alluvial fans along and between widely spaced drainageways. The Nebona Variant and Alko Variant soils occur on older, more highly dissected alluvial fans. The components of this unit are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are small areas of Joshua Variant sandy loam on crests and sideslopes of older alluvial fans, and small areas of Dunmovin loamy coarse sand along recent drainageways.

The Dunmovin Variant soil is deep and somewhat excessively drained. It formed in granitic alluvium and wind-blown sand deposits. Typically, the surface layer is pale brown loamy sand about 4 inches thick. The underlying material is yellowish brown and light yellowish brown loamy sand to a depth of 60 inches or more. Depth to a weakly silica-cemented horizon ranges from 35 to 40 inches.

Permeability of the Dunmovin Variant soil is moderately slow. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Nebona Variant soil is very shallow to shallow and well drained. It formed in alluvium of mixed origin. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The upper substratum is light yellowish brown clay loam about 2 inches thick. The underlying material is a light yellowish brown hardpan indurated by silica to a depth of 20 inches or more. Depth to the cemented hardpan ranges from 8 to 15 inches.

Permeability of the Nebona Variant soil is very slow, and available water capacity above the hardpan is 1.4 to 1.7 inches. Effective rooting depth is 8 to 15 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

Alko Variant soil is very shallow to shallow and well drained. It formed in alluvium of mixed origin. Typically, the surface layer is light yellowish brown, cobbly, loamy sand about 6 inches thick. The subsoil is brown and dark brown clay, gravelly clay, and gravelly sandy loam about 12 inches thick. The substratum is a dark yellowish brown hardpan indurated by silica and lime about 42 inches thick. Depth to the hardpan ranges from 8 to 20 inches. The soil is calcareous below a depth of about 12 inches.

Permeability of the Alko Variant soil is very slow. Available water capacity above the hardpan is 2.0 to 2.4 inches. Effective rooting depth is 8 to 20 inches. Runoff is slow to medium and the hazard of water erosion is slight to moderate.

This complex is used for range and wildlife habitat.

This complex is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surfaces, and by a duripan on the Nebona Variant and Alko Variant soils. Soil blowing resulting in soil loss, and deterioration of existing vegetation occurs

if overgrazed. Adequate cover should be left on the soil to reduce soil blowing. Hardpans restrict water movement and root growth. Proper stocking is a management practice suitable for use on this unit. Livestock watering troughs are present on this complex. The characteristic plant associations on this soil are Burro weed, Creosote bush, and Joshua tree.

Capability Subclass	Storie Index
VIIe nonirrigated	39

101 -- Garlock cobbly loamy coarse sand, 9 to 15 percent slopes. This deep, well-drained soil is on old stream terraces and dissected alluvial fans of the Sierra Nevada. It formed in alluvium of predominantly granitic origin. The soil is strongly dissected by moderately spaced drainageways. The soil occurs in one irregularly shaped body of about 113 acres in size. The vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3600 to 3900 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

Typically, the surface layer is brown cobbly loamy coarse sand about 6 inches thick. The upper subsoil is brown gravelly coarse sandy loam about 5 inches thick. The subsoil is reddish brown gravelly sandy clay loam about 11 inches thick. The lower subsoil is light yellowish brown gravelly sandy loam about 8 inches thick. The substratum is yellowish brown gravelly coarse sandy loam to a depth of 60 inches. Gravel content of the soil is 5 to 35 percent.

Included with this unit are small areas of Dunmovin bouldery loamy coarse sand making up about 15 percent of the total acreage. Most of the Dunmovin soil is at lower elevations and occurs in the drainageways.

Permeability of this Garlock soil is moderately slow. Available water capacity is 4.4 to 5.9 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is medium, and water erosion hazard is moderate.

Areas of this unit are used for pasture, range, and wildlife habitat.

This unit is suited for improved grazing land. It is limited by surface cobbles, which contribute to increased surface runoff, and difficulties in reseeding. Springs are present in this unit along the Sierra Nevada

escarpment which are suitable for supplemental water supply, seeding pasture grasses, and increased forage production. The characteristic plant associations on this unit are mainly Rabbit Bush and Cresote bush.

Capability Subclass: VIe nonirrigated
Storie Index: 22

120 -- Garlock Variant - Dunmovin - Rock outcrop association, rolling. This association is on recent alluvial fans and wind-deposited sands on top of basalt flows and cinder deposits. Slope is 5 to 15 percent. Surfaces are plane and not dissected by drainageways. Areas are irregular in shape and are 460 to 1712 acres in size. The natural vegetation is desert shrubs, grasses, forbs, and scattered Joshua trees. Elevation is 3300 to 3500 feet. The annual precipitation is about 5 to 6 inches; the average annual air temperature is about 57°F (14°C); and the frost-free season is 220 to 230 days.

This association is 40 percent Garlock Variant cobbly loamy sand, about 25 percent Dunmovin coarse sand, and about 15 percent basalt rock outcrop. Garlock Variant cobbly loamy sand occurs on basalt flows and cinder deposits, while Dunmovin coarse sand occurs as wind-reworked, coarse sand on stabilized sand dunes in elongated bodies with a general east-to-west orientation.

Included in this association are areas of fine-loamy, mixed, thermic Typic Haplargids intermingled with the soils of this unit and occupying about 10 percent of the total acreage. Also included are soils with up to 24 inches of wind-blown sands overlying the Typic Haplargids. These soils make up about 10 percent of the total acreage.

The Garlock Variant soil is moderately deep and well-drained. It formed in basalt flows and cinder deposits overlain by wind-blown sand deposits. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The subsoil is a yellowish brown clay loam about 15 inches thick. The lower subsoil is a reddish yellow clay loam about 11 inches thick. The soil overlies reddish brown cinders at about 32 inches. The soil is calcareous below a depth of about 21 inches. Depth to cinders or basalt ranges from 26 to 40 inches.

Permeability of the Garlock Variant soil is moderately slow, and available water capacity is 5.2 to 5.9 inches to the underlying cinders.

Effective rooting depth is 26 to 40 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

The Dunmovin soil is deep and excessively drained. It formed in wind-reworked coarse sand. Typically, the surface layer is very pale brown coarse sand about 3 inches thick. The substratum is light yellowish brown loamy coarse sand about 57 inches thick.

Permeability of the Dunmovin soil is very rapid. Available water capacity is 2.4 to 3.6 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Rock outcrop consists of jagged basalt, mostly less than 1/4 acre in size and black in color. Drainage is excessive and runoff is very rapid. Thereis no erosion hazard, and no effective rooting depth.

Most areas of this association are used for cinder mining, rangeland, and wildlife habitat.

This association is poorly suited for rangeland. The production of vegetation suitable for livestock grazing is limited by coarse surface textures and a cobbly surface. Soil blowing results in soil loss and deterioration of existing vegetation. Adequate cover should be left to reduce the hazard of soil blowing. A steep escarpment occurs in this unit in the southwest corner of the survey area. The characteristic plant associations are Shadscale, Allscale, Rabbit Bush, Creosote bush, and Joshua tree.

Capability Subclass	Storie Index
VIIe nonirrigated	31

121 -- Garlock Variant - Dunmovin association, rolling. This association is on recent alluvial fans and wind-deposited sands on top of basalt flows and cinder deposits. Slope is 5 to 15 percent. Areas are irregular in shape and are 120 to 335 acres in size. The natural vegetation is desert shrubs, grasses, forbs, and scattered Joshua trees. Elevation is 3300 to 3500 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This unit is 60 percent Garlock Variant cobbly loamy sand and about 25 percent Dunmovin loamy coarse sand. Garlock Variant cobbly loamy sand occurs on basalt flows and cinder deposits, while Dunmovin loamy coarse sand occurs as wind-reworked coarse sand in stabilized sand dunes.

Included in this association are small areas of Typic Haplargids, fine-loamy, mixed, thermic, constituting about 10 percent of the total acreage and intermixed with the soils of this unit. Also included is about 5 percent basalt rock outcrop.

The Garlock Variant soil is moderately deep and well drained. It formed in basalt flows and cinder deposits overlain by wind-blown sands. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The subsoil is a yellowish brown clay loam about 15 inches thick. The lower subsoil is a reddish yellow clay loam about 11 inches thick. The soil overlies reddish brown cinders at about 32 inches. Depth to cinders or basalt ranges from 26 to 40 inches. The soil is calcareous below a depth of about 21 inches.

Permeability of the Garlock Variant soil is moderately slow, and available water capacity is 5.2 to 5.9 inches to the underlying cinders. Effective rooting depth is 26 to 40 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

The Dunmovin soil is deep and somewhat excessively drained. It formed in recent alluvium and wind-blown sands. Typically, the surface layer is pale brown, loamy, coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy, coarse sand. The soil is commonly calcareous below a depth of about 29 inches.

Permeability of this Dunmovin soil is rapid. Available water capacity to a depth of 60 inches is 3.0 to 4.2 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

Most areas of this soil are used for rangeland and wildlife habitat.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by coarse surface textures and cobbly surface. Soil blowing results in soil loss and deterioration of the existing vegetation. Adequate cover should be left on the soil to minimize the hazard of soil blowing. The characteristic plant associations are Creosote bush, Shadscale, and Rabbit Bush.

Capability Subclass	Storie Index
VIIe nonirrigated	28

220 -- Gass Variant - Garlock Variant complex, 5 to 15 percent slopes. This complex is on uplands overlying basalt flows and cinder deposits. Areas are irregular in shape and are 65 to 1144 acres in size. The natural vegetation is mainly desert shrubs, grasses, forbs, and some Joshua trees. Elevation ranges from 3300 to 4400 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 50 percent Gass Variant cobbly fine sandy loam, and 25 percent Garlock Variant cobbly loamy sand, 5 to 15 percent slopes. Gass Variant soils overlie basalt bedrock at 20 to 40 inches depth. Garlock Variant soils overlie basalt and cinder deposits at 26 to 40 inches depth. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are areas of Sparkhule cobbly loamy sand over basalt bedrock at less than 20 inches depth, making up about 10 percent of the total acreage. Basalt rock outcrops comprise about 15 percent of the total acreage.

The Gass Variant soil is moderately deep, and well drained. It is formed in residual material weathered from fractured basalt. Typically, the surface layer is brown cobbly fine sandy loam about 5 inches thick. The subsoil is brown to dark brown clay about 18 inches thick. The substratum is dark yellowish brown very stony clay loam about 17 inches thick. Depth to bedrock is 20 to 40 inches. The soil is calcareous below a depth of about 15 inches.

Permeability of the Gass Variant soil is slow. Available water capacity is 4.5 to 5.3 inches to bedrock at 40 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow to medium and the hazard of water erosion is slight to moderate. The soil is moderately saline below about 23 inches depth.

The Garlock Variant soil is moderately deep and well drained. It formed in basalt flows and cinder deposits overlain by wind-blown sand deposits. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The subsoil is yellowish brown clay loam about 15 inches thick. The lower subsoil is reddish yellow clay loam about 11 inches thick. The soil overlies reddish brown cinders at about 32 inches. The soil is calcareous below a depth of about 21 inches. Depth to a lithic contact with basalt or cinders is 26 to 40 inches.

Permeability of the Garlock Variant soil is moderately slow, and available water capacity is 5.2 to 5.9 inches to the underlying cinders at 32 inches depth. Effective rooting depth is 26 to 40 inches. Runoff is slow to medium and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This complex is used for range, wildlife habitat, and military reservation.

This complex is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by low rainfall and cobbly surfaces. Some escarpments are present in this map unit. The characteristic plant associations on this unit are Shadscale, Allscale, Creosote bush, Burro weed, and Rabbit Bush.

Capability Subclass	Storie Index
VIIe nonirrigated	45

170 -- Haybourne loamy sand, 5 to 15 percent slopes. This deep, well-drained soil is on higher elevation intermountain valleys and swales of the Coso Range. It also occurs around higher elevation, internally drained playa areas. The soil formed in residual material weathered from rhyolitic tuff, volcanic ash deposits, mixed alluvium, and cinders. Areas are irregular in shape and are 375 to 460 acres in size. Many areas are dissected by shallow to moderate, closely spaced drainageways. The vegetation is mainly desert shrubs, grasses, and Joshua trees. Elevation ranges from 4700 to 4900 feet. The annual precipitation is about 7 to 8 inches, the average air temperature is about 54 to 56°F, and the frost-free season is 210 to 220 days.

Typically, the surface layer is grayish brown and dark grayish brown loamy sand about 9 inches thick. The subsoil is brown and yellowish brown light sandy loam about 36 inches thick. The substratum to a depth of 60 inches is brown light sandy loam.

Included with this unit is Shoken stony sandy loam on granitic sideslopes. Shoken soils make up about 10 percent of the total acreage. Also included are about 5 percent of Stumble loamy coarse sand intermingled with the soils of this unit.

Permeability of this Hayborne soil is moderately rapid. Available water capacity is 6.2 to 7.4 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This mapping unit is used for range, wildlife habitat, and military reservation.

This unit is suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures. Soil blowing results in soil loss and deterioration of existing vegetation. The soil supports sparse stands of plants that are suitable for grazing.

Adequate cover should be left on the soil, and proper grazing use is a management practice suitable for this unit. The characteristic plant associations on the Haybourne soil are Rabbit Bush, Joshua tree, and Four-winged saltbush.

Capability Subclass: VIIe nonirrigated
Storie Index: 54

182 -- Hooten Variant bouldery loamy fine sand, 5 to 15 percent slopes. This shallow, well-drained soil is on older, strongly dissected alluvial fans of Rose Valley. It formed in granitic and andesitic colluvium and alluvium. These soils have a bouldery surface on the upper alluvial fans. The soil occurs in two irregularly shaped bodies of about 30 to 220 acres in size. The soil is dissected by deep, closely spaced drainageways. The vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3600 to 4200 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

Typically, the surface layer is brown bouldery loamy fine sand about 4 inches thick. The subsurface layer is pale brown cobbly sandy loam about 7 inches thick. The upper substratum is a yellowish brown discotninuous, strongly silica-cemented hardpan with finely stratified, cobbly sandy loams about 4 inches thick. The underlying material is pale brown, light yellowish brown, and yellowish brown very gravelly loamy sand to a depth of 60 inches. Boulders, stones, and cobbles constitute 5 to 35 percent of the surface soil.

Included with this unit are areas of Dunmovin bouldery, loamy, coarse sand in drainageways, making up about 10 percent of the total acreage. Also included are small areas of Hooten Variant loamy fine sand (lacking the surface boulders) in lower positions on the fan.

Permeability of this Hooten Variant soil is very slow. Available water capacity is 1.0 to 1.4 inches above the hardpan to a depth of 20 inches. Effective rooting depth above the hardpan is 8 to 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This soil is used for rangeland and wildlife habitat.

This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by surface boulders and a hardpan. The strongly cemented to indurated hardpan at about 11 inches depth restricts water movement and root growth. Range management practices suitable for use on this unit are limited to proper grazing use. The characteristic plant associations on this unit are Cresote bush and Burro weed.

Capability Subclass: VIIe nonirrigated
Storie Index: 4

183 -- Hooten Variant loamy fine sand, 5 to 9 percent slopes. This shallow, well-drained soil overlying a strongly silica-cemented to indurated hardpan at 8 to 20 inches depth, occurs on younger, slightly dissected alluvial fans from the Coso Range. It formed in alluvium from andesite and granite. The soil occurs in one irregularly shaped body about 250 acres in size. The soil is dissected by shallow, moderately spaced drainageways. Vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3450 to 3650 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

Typically, the surface layer is brown loamy fine sand about 4 inches thick. The subsurface layer is pale brown cobbly sandy loam about 7 inches thick. The upper substratum is a yellowish brown discontinuous, strongly silica-cemented hardpan with finely stratified cobbly sandy loams about 4 inches thick. The underlying material is pale brown, light yellowish brown and yellowish brown very gravelly loamy coarse sand to a depth of 60 inches.

Included in mapping is about 5 percent Hooten bouldery loamy coarse sand in upper positions on the fan, and about 10 percent Dunmovin loamy coarse sand in drainageways.

Permeability of this Hooten Variant soil is very slow. Available water capacity is 1.0 to 1.4 inches above the hardpan to a depth of 20 inches. Effective rooting depth above the hardpan is 8 to 20 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This unit is used for rangeland and wildlife habitat. It is poorly suited for use as rangeland. The production of vegetation suitable for grazing is limited by a hardpan. The strongly cemented to indurated hardpan at about 11 inches depth restricts water movement and root growth. Range management practices suitable for use on this unit are limited to proper grazing use. The characteristic plant associations on this unit are Cresote bush and Burro weed.

Capability subclass: VIIe nonirrigated

Storie Index: 13

190 -- Joshua Variant - Nebona Variant complex, 2 to 30 percent slopes. This complex is on older dissected alluvial fans in the Coso Range and Coso Basin. Areas are irregular in shape and are 28 to 311 acres in size. Many areas are dissected by moderate to deep, moderately spaced drainageways. The natural vegetation is mainly desert shrubs, grasses, and forbs. Elevation is 3400 to 4500 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 60 percent Joshua Variant, sandy loam, and 20 percent Nebona Variant cobbly loamy sand. Both soils occur on crests and sideslopes of strongly dissected alluvial fans and terraces. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are areas of Alko Variant cobbly loamy sand occurring in similar positions as the Joshua Variant and Nebona Variant soils. Also included is Dunmovin loamy coarse sand on concave positions in recent drainageways. Each included soil makes up about 10 percent of the total acreage.

The Joshua Variant soil is deep and well drained. It formed in alluvium predominantly of granitic origin. Typically, the surface layer is pale brown sandy loam about 2 inches thick. The subsoil is light yellowish brown and yellowish brown, light sandy clay loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam stratified with thin, discontinous, weakly silica-cemented lenses about 5 inches thick. The underlying material is yellowish brown very gravelly loamy sand to a depth of 60 inches. Depth to the weakly cemented layer ranges from 9 to 22 inches.

Permeability of the Joshua Variant soil is moderate. Available water capacity is 2.7 to 4.0 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium and the hazard of water erosion is slight to moderate. The hazard of soil blowing is moderate.

The Nebona Variant soil is very shallow to shallow, and well drained. It formed in alluvium of mixed origin. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The upper substratum is light yellowish brown clay loam about 2 inches thick. The underlying material is a light yellowish brown hardpan indurated by silica to a depth of 20 inches or more. Depth to the cemented hardpan ranges from 8 to 15 inches.

Permeability of the Nebona Variant soil is very slow, and the available water capacity above the hardpan is 1.4 to 1.7 inches. Effective rooting depth is 8 to 20 inches. Runoff is slow to rapid, and the hazard of water erosion is slight to high.

This complex is used for range, wildlife habitat, and military reservation. It is poorly suited for rangeland. The production of vegetation suitable for livestock grazing is limited by the presence of a duripan in both the Joshua Variant and Nebona Variant soils. The duripan restricts root growth and water movement through the soil. Moderately steep slopes present on more strongly dissected areas are difficult to graze. Adequate cover should be left on the soil, and development of trails in steeper sloping areas is a management practice used to provide access to less frequently grazed areas. This map unit occurs adjacent to a stream bed in Coso Basin. The characteristic plant associations on this unit are Allscale, Creosote bush, Burro weed, and Rabbit Bush,

Capability Subclass	Storie Index
VIIe nonirrigated	34

150 -- Joshua Variant - Arizo - Lavic complex, 2 to 5 percent slopes. This complex is on recent and older alluvial fans from the Coso Range. Areas are irregular in shape and are 182 to 490 acres in size. Most areas are dissected by shallow to moderately deep, moderately spaced drainageways. The natural vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3840 to 4600 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 45 percent Joshua Variant sandy loam, 2 to 5 percent slopes; 25 percent Arizo very bouldery loamy sand, 2 to 5 percent slopes; and 20 percent Lavic loamy sand, 2 to 5 percent slopes. Joshua Variant sandy loam occurs on alluvial crests, sideslopes and alluvial knolls. Arizo very bouldery loamy sand occurs in drainageways. Lavic loamy sand occurs in drainageways. Lavic loamy sand occurs in similar positions as the Joshua Variant soil, in addition to occurring in drainageways. The soils of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are small areas of Nebona Variant and Alko Variant soils occurring in similar positions as the Joshua Variant soil, and on older alluvial surfaces of the unit. Included areas make up about 10 percent of the total acreage.

The Joshua Variant soil is deep and well drained. It formed in alluvium predominantly of granitic origin. Typically, the surface layer is pale brown sandy loam about 2 inches thick. The subsoil is light yellowish brown and yellowish brown sandy clay loam about 9 inches thick. The substratum is light yellowish brown gravelly coarse sandy loam stratified with thin discontinuous weakly silica-cemented lenses about 5 inches thick. The underlying material is yellowish brown very gravelly loamy sand to a depth of 60 inches. Depth to the weakly cemented layer ranges from 9 to 22 inches.

Permeability of the Joshua Variant soil is moderate, and available water capacity is 2.7 to 4.0 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Arizo soil is deep and excessively drained. It formed in mixed bouldery andesitic and granitic alluvium. Typically, the surface layer is brown very bouldery loamy sand about 5 inches thick. The underlying material to a depth of 60 inches is pale brown and light yellowish brown very bouldery loamy sand. Boulder and stone surface cover is 35 to 45 percent.

Permeability of the Arizo soil is very rapid. Available water capacity is 1.8 to 3.0 inches to a depth of 60 inches. Effective rooting depth is 60 inches and more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Lavic soil is deep, well drained, and variably stratified. It formed in alluvial valley fill. Typically, the surface layer is pale brown loamy sand about 5 inches thick. The subsurface layer is light yellowish brown, sandy loam about 11 inches thick. The subsoil is yellowish brown sandy loam about 4 inches thick. The substratum consists of pale brown stratified loam, loamy fine sand, and very gravelly coarse sand. The soil is calcareous below a depth of about 5 inches.

Permeability of the Lavic soil is moderate, and available water capacity is 6.75 to 7.75 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This complex is used for rangeland and wildlife habitat.

This complex is poorly suited for livestock grazing. The production of vegetation suitable for livestock grazing is limited by a duripan on the Joshua Variant soil, by a sandy surface with stones, boulders on the Arizo soil, and by a sandy surface on the Lavic soil. The duripan restricts water movement and root growth. The bouldery surface of the Arizo soil contributes to lower forage yields. An adequate surface cover should be left on the soils to control soil blowing, which results in soil loss and deterioration of the existing vegetation. The characteristic plant associations on this unit are Allscale, Creosote bush, Burro weed, and Rabbit Bush.

Capability Subclass	Storie Index
VIIe nonirrigated	44

222 -- Lava Flows - Lithic Torripsamments complex, 5 to 30 percent slopes. This complex is on lava flows and wind-deposited sands overlying the lava flows. Areas are irregular in shape and are 20 to 1040 acres in size. The natural vegetation is mainly scattered desert shrubs and grasses. Elevation is 3200 to 4000 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is about 70 percent lava flows, consisting of jagged outcrops of dark-colored basalt, and about 20 percent mixed, thermic, Lithic Torripsamments, occurring as wind-deposited sands overlying the basalt. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this unit is Sparkhule stony loamy fine sand forming in the basalt, which makes up about 10 percent of the total acreage.

The Lithic Torripsamments are shallow and somewhat excessively drained. It formed in aeolian sands overlying the basalt. Typically, the surface layer is pale brown loamy fine sand about 8 inches thick. Basalt scoria is at a depth of 8 inches.

Permeability of the Lithic Torripsamments is rapid. Available water capacity is low. Effective rooting depth is 8 inches. Runoff is slow and the hazard of water erosion is slight. The hazard of soil blowing is high.

Most areas of this complex are used for wildlife habitat and military reservation. The characteristic plant associations on this unit are Allscale and Rabbit Bush.

Capability Subclass	Storie Index
VIIIs	not rated

107 -- Lavic - Dunmovin - Playa association, nearly level. This association is on lower alluvial fans, interplaya flats, and valley basins. The soils in this unit occur in a narrow, irregularly shaped body of about 2121 acres in size. A shallow intermittent stream flows south in the lowest portion of Rose Valley into Little Lake. The natural vegetation is desert shrubs, grasses, and forbs. Elevation is 3300 to 3400 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This unit is 50 percent Lavic loamy sand, 0 to 2 percent slopes; 20 percent Dunmovin loamy coarse sand, 0 to 2 percent slopes; and 15 percent Playa. Lavic loamy sand occurs in interplaya flats where valley fill materials have accumulated. Dunmovin loamy, coarse sand occurs in slightly higher positions predominantly along the periphery of the map unit. Playa areas occur in valley basins, and they are intermittently covered with water.

Included in this unit are areas of loamy-skeletal, mixed, thermic Typic Camborthids occurring on slight rises which are associated with old gravel bars. These soils constitute about 10 percent of the total acreage. Also included are small areas of fine-silty, mixed, thermic Typic Torriorthents in shallow vegetated depressions which periodically pond in the winter months.

The Lavic soil is deep, well-drained, and variably stratified. It formed in alluvial valley fill. Typically, the surface layer is pale brown loamy sand about 5 inches thick. The subsurface layer is light yellowish brown sandy loam about 11 inches thick. The subsoil is yellowish brown sandy loam about 4 inches thick. The substratum consists of pale brown stratified loam, loamy fine sand, and very gravelly coarse sand. The soil is calcareous below a depth of about 5 inches. The substratum is strongly alkaline.

Permeability of the Lavic soil is moderate, and available water capacity is 6.75 to 7.75 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Lavic soil is moderately saline in the substratum below about 20 inches depth.

The Dunmovin soil is deep and somewhat excessively drained. It formed in alluvium from mostly granitic sources. Typically, the surface layer is pale brown loamy coarse sand about 3 inches thick. The upper substratum is yellowish brown loamy coarse sand about 26 inches thick. The underlying material to a depth of 72 inches is light yellowish brown loamy coarse sand. The soil is commonly calcareous below a depth of about 29 inches.

Permeability of this Dunmovin soil is rapid, and the available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

Playa areas are very poorly drained. They formed in valley basin alluvial fill materials. They are intermittently covered with water during periods of runoff from higher lying areas. Permeability of playas is very slow. Playas have few plants on scattered mounds, but they are mostly bare of vegetation. Runoff is ponded. Playas are moderately to strongly saline, and moderately to very strongly alkaline in reaction.

This complex is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a sandy surface on the Dunmovin and Lavic soils, and by salinity in the Playa areas. Lack of adequate precipitation also limits production of forage. Soil blowing due to sandy surfaces results in soil loss and deterioration of existing

vegetation. Leaving adequate cover is a management practice suited for use on this unit. A shallow intermittent stream dissects this unit. The characteristic plant associations on this unit are Allscale, Shadscale, and Bud Sagebrush.

Capability Subclass: VIIe nonirrigated

Storie Index: 69

141 -- Maynard Lake loamy coarse sand, 15 to 30 percent slopes. This deep, somewhat excessively drained soil is on lower rhyolitic dome toeslopes, ash-covered granitic uplands and sideslopes and upland valleys of the Coso Range. It formed in alluvium derived from welded rhyolitic tuff and volcanic ash deposits, which include other pyroclastics such as obsidian and perlite. Many areas are dissected by shallow, moderately spaced drainageways. Areas are irregular in shape and range in size from 25 to 682 acres. Vegetation is desert shrubs, grasses, and forbs. Elevations are 3400 to 4800 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

Typically, the surface layer is grayish brown loamy coarse sand about 3 inches thick. The underlying material to a depth of 60 inches is pale brown, brown, and yellowish brown gravelly loamy sand. Gravel content of the underlying material is 5 to 30 percent. Depth to carbonates is about 51 inches.

Included with this unit are areas of Maynard Lake loamy coarse sand overlying welded tuff at 40 to 60 inches depth, occurring in similar positions as the deeper Maynard Lake soil. It constitutes about 15 percent of the total acreage. Also included are 5 percent of Coso stony sandy loam on granitic sideslopes.

Permeability of this Maynard Lake soil is rapid, and available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is medium and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation. There are also a few pumice mines located on this unit.

This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a sandy surface texture. Soil blowing due to removal of plant cover results in soil loss and deterioration of the existing vegetation. The preservation of a protective plant cover and proper grazing use are management practices suited for use on this unit. Fumaroles and quarries are located in this unit. The characteristic plant associations on this unit are Shadscale, Allscale, Creosote bush, and Rabbit Bush.

142 -- Maynard Lake loamy coarse sand, 2 to 15 percent slopes. This deep, somewhat excessively drained soil is on alluvial fans in upland valleys of the Coso Range. It formed in alluvium derived from mixed sources, including rhyolitic tuff and volcanic ash deposits, and other pyroclastics such as obsidian and perlite. This alluvium contains less cinders and volcanic ash and more coarse granitic fragments (orthoclase and quartz). Slopes are plane to slightly convex. Areas are irregular in shape and are 35 to 681 acres in size. The vegetation is mainly desert shrubs, grasses, and forbs. Elevation ranges from 3900 to 4400 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is grayish brown loamy coarse sand about 3 inches thick. The underlying material to a depth of 60 inches is pale brown, brown, and yellowish brown gravelly loamy sand. Gravel content of the underlying material is 5 to 30 percent. Depth to carbonates is about 51 inches.

Included with this unit are areas of Dunmovin loamy coarse sand on alluvial fans below granitic uplands. Also included are small, internally drained playa areas in basin positions. Included areas make up about 20 percent of the total acreage.

Permeability of this Maynard Lake soil is rapid, and available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation.

This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a sandy surface texture. Soil blowing due to removal of plant cover results in soil loss and deterioration of the existing vegetation. The preservation of a protective plant cover and proper grazing use are management practices suited for use on this unit. The characteristic plant associations on this soil are Shadscale, Creosote bush, Rabbit Bush, and Four-winged Saltbush.

Capability Subclass: VIIe nonirrigated
Storie Index: 50

140 -- Maynard Lake loamy coarse sand, 30 to 50 percent slopes. This deep, somewhat excessively drained soil is on sideslopes of rhyolitic domes and granitic uplands of the Coso Range. It formed in rhyolitic tuff and volcanic ash deposits, which includes other pyroclastics such as obsidian and perlite. Slopes are plane and are dissected by shallow to moderately deep, moderately spaced drainageways. Areas are irregular in shape and are 45 to 387 acres in size. Vegetation is desert shrubs, grasses, and forbs. Elevation is 3800 to 4800 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is grayish brown loamy coarse sand about 3 inches thick. The underlying material to a depth of 60 inches is pale brown, brown, and yellowish brown gravelly loamy sand. Depth to carbonates is about 51 inches.

Included with this unit are areas of Maynard Lake loamy, coarse sand over welded tuff at 20 to 60 inches depth. It constitutes about 15 percent of the total acreage. Also included are about 5 percent of Coso stony sandy loam on upper granitic sideslopes.

Permeability of this Maynard Lake soil is rapid, and available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches and more. Runoff is medium to rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation.

This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by steep slopes. Steep slopes are difficult to graze and erosion resulting in soil loss may

occur if overgrazed. Adequate cover should be left on the soil to inhibit soil blowing and water erosion. Trails or walkways can be constructed on slopes to encourage livestock grazing in areas where access is limited. The characteristic plant associations on this unit are Creosote bush, Rabbit Bush, and Joshua tree.

Capability Subclass: VIIe nonirrigated

Storie Index: 24

133 -- Maynard Lake - Coso Complex, 15 to 30 percent slopes. This complex is on recent alluvial fans and upland sideslopes overlying granite bedrock. Areas are irregular in shape and are 39 to 324 acres in size. The natural vegetation is mainly desert shrubs, grasses, forbs, and some Joshua trees. Elevation is 4100 to 4800 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season ranges from 220 to 230 days.

This unit is 50 percent Maynard Lake loamy coarse sand and 40 percent Coso stony, sandy loam. Maynard Lake loamy, coarse sand is on sideslopes of granitic and andesitic upland areas. Coso stony sandy loam also occurs on upper granitic sideslopes. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are small areas of Maynard Lake loamy coarse sand overlying welded tuff at 20 to 60 inches depth. Also included are small areas of granitic rock outcrops.

The Maynard Lake soil is deep and somehwat excessively drained. It formed in rhyolitic tuff and volcanic ash deposits. Typically, the surface layer is grayish brown loamy coarse sand about 3 inches thick. The underlying material to a depth of 60 inches is pale brown, brown, and yellowish brown gravelly loamy sand. Depth to carbonates is about 51 inches.

Permeability of this Maynard Lake soil is rapid, and available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches and more. Runoff is medium, and the hazard of water erosion is moderate.

The Coso soil is shallow and very shallow and somewhat excessively drained. It formed in residual material weathered from granite. Typically, the surface layer is pale brown stony sandy loam about 8 inches thick. The substratum is weathered fractured granite with loamy sand, sandy loam, or sandy clay loam in fractures to a depth of 60 inches.

Permeability of the Coso soil is moderately rapid. Available water capacity to a depth of 8 to 20 inches is 1.0 to 1.4 inches. Effective rooting depth is 8 to 20 inches, with some roots in fractures to a depth of 40 inches or more. Runoff is medium and erosion hazard by water is moderate.

Areas of this complex are used for wildlife habitat and military reservation. The characteristic plant association on this unit is Rabbit Bush.

Capability Subclass: VIIe nonirrigated
Storie Index: 18

180 -- Nebona Variant - Alko Variant cobbly loamy sands, 5 to 30 percent slopes. This complex is on old alluvial fans and terraces. Areas are irregular in shape and are 140 to 2800 acres in size. Most areas are strongly dissected by deep, moderately spaced drainageways. Both soils are underlain by an indurated hardpan at about 8 to 20 inches depth. The natural vegetation consists of desert shrubs, grasses, and forbs. Elevation is 3100 to 4500 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

This unit is 30 percent Nebona cobbly loamy sand and 30 percent Alko Variant cobbly loamy sand, 5 to 30 percent slopes. Both soils are on the crests and sideslopes of older, more strongly dissected alluvial fans and terraces.

Included in this unit are areas of Joshua Variant soils in similar positions but occurring where the hardpan is weakly cemented. Areas of Dunmovin cobbly loamy sand occur in concave positions in drainageways. Areas of Torriorthents cobbly loamy sands occupy shoulders in the old alluvial fans where the hardpan is absent and where mostly unconsolidated gravelly parent materials are exposed. Also included are soils with hardpans present at less than 8 inches depth, which occur in similar positions as the Nebona Variant and Alko Variant soils. Included areas each make up about 10 percent of the total acreage.

The Nebona Variant soil is very shallow or shallow and well-drained. It formed in alluvium of mixed origin. Typically, the surface layer is pale brown cobbly loamy sand about 6 inches thick. The upper substratum is light yellowish brown clay loam about 2 inches thick. The underlying material is a light yellowish brown hardpan indurated by silica to a depth of 20 inches or more. Depth to the cemented hardpan ranges from 8 to 15 inches.

Permeability of the Nebona Variant soil is very slow, and available water capacity above the hardpan is 1.4 to 1.7 inches. Effective rooting

depth is 8 to 15 inches. Runoff is medium to rapid and the hazard of water erosion is moderate to high.

The Alko Variant soil is very shallow to shallow and well-drained. It formed in alluvium of mixed origin. Typically, the surface layer is light yellowish brown cobbly loamy sand about 6 inches thick. The subsoil is brown to dark brown clay and gravelly clay, about 6 inches thick. The substratum is yellowish brown gravelly sandy loam about 6 inches thick. The underlying material is a yellowish brown and dark yellowish brown hardpan indurated by silica about 42 inches thick. Depth to the hardpan ranges from 8 to 20 inches. The soil is calcareous below a depth of about 12 inches.

Permeability of the Alko VAriant soil is very slow. Available water capacity above the hardpan is 2.0 to 2.4 inches. Effective rooting depth is 8 to 20 inches. Runoff is medium to rapid and the hazard of water erosion is moderate to high.

Areas of this complex are used for rangeland and wildlife habitat. Limited areas are in military reservation. This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a hardpan and cobbly surface on the Nebona Variant and Alko Variant soils. The hardpan restricts water movement and root growth, and the stony surface results in lower yields. Proper grazing use is a management practice suited for use on this unit. The characteristic plant associations on this unit are Creosote bush, Burro weed, and Rabbit Bush.

Capability Subclass: VIIe nonirrigated
Storie Index: 9

110 -- Playa. This mapping unit consists of Playa, a miscellaneous land type. Playas are basin areas in desert landscapes. They are intermittently covered with water during periods of runoff from higher-lying areas. Playas have a few plants on scattered mounds, but they are mostly bare of vegetation. Playas serve as temporary water basins used by wildlife.

This unit is not suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by soil salinity. Playa areas are subject to periodic ponding. The characteristic plant association on this unit is Four-winged Saltbush.

Capability Subclass: VIIIw

Storie Index: Not rated

111 -- Riverwash. A miscellaneous land type, Riverwash consists of recently deposited materials along watercourses. The materials are stratified, highly variable within short distances, and subject to periodic overflow. Vegetation is mostly absent. Elevation ranges from 3550 to 3750 feet. The annual precipitation is 5 to 6 inches, the average annual air temperature is 57°F (14°C), and the frost-free season is 220 to 230 days.

Included with this unit are Torrifluvents occurring in the less frequently flooded sand and gravel bars associated with Riverwash. Also included are Torriorthents occurring in similar positions as Torrifluvents. Included areas make up about 10 percent of the total acreage.

This mapping unit is used mostly by wildlife and for very limited range. It is also a source of sand and gravel deposits.

This unit is very poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by surface overflow, and stony and cobbly surface. Surface overflow results in increased moisture to the soils and may contribute to better forage yields. Adequate cover should be left on this unit, and proper grazing use is a management practice suited for use on this unit. A stream course runs through areas of this unit. The characteristic plant associations on this unit are Allscale, Creosote bush, Shadscale, and Rabbit Bush.

Capability Subclass: VIIw
Storie Index: Not rated

232 -- Rock outcrop - Haiwee Variant complex, 30 to 50 percent slopes. This complex is on steeply sloping andesitic uplands. Areas are irregular in shape and vary from 120 to 468 acres in size. The natural vegetation consists of desert shrubs, grasses, and forbs. Elevation is 3800 to 5800 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

This complex is 45 percent Rock outcrop and 35 percent Haiwee Variant very stony loam. The components of this unit were so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are loamy-skeletal, mixed, mesic Typic Torriorthents, which are mainly 20 to 40 inches deep over andesite. They occur on lower slopes and are covered with colluvial slope wash in places. They comprise about 15 percent of the total acreage. Also included are small areas of Stumble loamy coarse sand overlying andesitic tuff at 20 to 60 inches depth in small scattered areas.

Rock Outcrop is andesitic bedrock above 4800 feet elevation.

The Haiwee Variant soil is shallow and somewhat excessively drained. It formed in andesite bedrock and colluvium. Typically, the surface layer is grayish brown very stony loam about 3 inches thick. The underlying material is grayish brown stony loam about 12 inches to bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of this Haiwee Variant soil is moderate. Available water capacity is 2.0 to 2.4 inches to 20 inches depth. Effective rooting depth is 10 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is high.

This map unit is used for wildlife habitat and scoria mining in the andesitic tuff. The characteristic plant associations on this unit are Mixed Desert Scrub, Shadscale, Burro weed, and Rabbit Bush.

Capability Subclass	Storie Index
VIIIs	6

160 -- Rubble land - Torriorthents - Rock outcrop complex, 30 to 75 percent slopes. This complex is on upland rhyolite domes. Areas are generally circular in shape and range in size from 22 to 1416 acres. The natural vegetation is mainly desert shrubs and grasses. Elevation is 3800 to 5600 feet. The annual precipitation is about 5 to 8 inches, the average annual air temperature is 54 to 57°F (12 to 14°C), and the frost-free season is 210 to 230 days.

This complex is 35 percent Rubble land, 35 percent Torriorthents, and 15 percent Rock outcrop. The components of this unit are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are areas of Maynard Lake loamy coarse sand overlying welded tuffs at 20 to 60 inches depth, occurring predominantly on the lower toeslopes of the rhyolitic domes. Included areas make up about 15 percent of the total acreage.

Rubble land, a miscellaneous land type, consists of areas with 90 percent or more of the surface covered with stones.

Torriorthents are moderately deep and excessively drained. They formed in residual material weathered from rhyolite, rhyolitic talus and colluvium. Typically, the surface layer is brown very stony sandy loam about 2 inches thick. The underlying material is pale brown and very pale brown very stony sandy loam and extremely stony loamy sand to bedrock at a depth of 30 inches. Depth to bedrock ranges from 20 to 40 inches. Carbonates coat lower rock surfaces below about 12 inches.

Permeability of this Torriorthent soil is moderately rapid. Available water capacity is 1.0 to 1.2 inches to 30 inches depth. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid and the hazard of water erosion is moderate to high.

Rock outcrop, a miscellaneous land type, consists of areas with 90 percent or more rock outcrops. The bedrock is mostly rhyolite.

This mapping unit is used for wildlife habitat and military reservation. The characteristic plant associations on thus unit are Shadscale and Rabbit Bush.

Capability Subclass	Storie Index
VIIIs	not rated

234 -- Shoken - Rock outcrop association, steep. This association is on high-elevation granitic uplands. Slope is 30 to 50 percent. The soils in this association occur mostly in narrow bodies of 28 to 1187 acres in size, separated by outcrops of granite. The natural vegetation is desert shrubs, grasses, and some Joshua trees. Elevation is 4800 to 5800 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is about 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

This unit is 40 percent Shoken stony sandy loam and 35 percent Rock outcrop. Shoken soils overlie weathered granite bedrock interspersed between granitic rock outcrops.

Included in this association are areas of loamy-skeletal, mixed, mesic, Lithic Torriorthents, which are similar to the Haiwee soils of map unit 130. They occur in similar positions as the Shoken soils. The Lithic Torriorthents comprise about 15 percent of the total acreage. Also included are small areas of fine, mixed, mesic Typic Haplargids on crests and benches, and small areas of loamy-skeletal, mixed, mesic Typic Camborthids. These soils are 20 to 30 inches deep overlying weathered granite.

The Shoken soil is shallow to very shallow and somewhat excessively drained. It formed in residuum from granite and granitic colluvium. Typically, the surface layer is pale brown stony sandy loam about 3 inches thick. The underlying material is weathered granite crushing to light sandy loam to a depth of 15 inches. Depth to hard, fractured granite ranges from 20 to 25 inches.

Permeability of this Shoken soil is rapid. Available water capacity to a depth of 15 inches is 0.8 to 1.1 inches. Effective rooting depth is 3 to 15 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is moderate.

Rock Outcrop consists of granite mostly on ridgetops and upper sideslopes.

This association is used for wildlife habitat, military reservation, and watershed purposes. The characteristic plant associations on this unit are Rabbit Bush and Joshua tree.

Capability Subclass	Storie Index
VIIe nonirrigated	6

221 -- Sparkhule - Lava flows complex, 5 to 30 percent slopes. This complex is on basaltic uplands and cinder cones. Areas are irregular in shape and are 51 to 191 acres in size. The natural vegetation is mainly desert shrubs, grasses, and forbs. Elevations range from 2800 to 4600 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

This complex is 65 percent Sparkhule very stony loamy fine sand, and 20 percent Lava flows. The Sparkhule soil occurs in areas adjacent to the lava flows. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this complex are small areas of Lithic Torripsamments consisting of wind-blown sands overlying basalt rock. Also included are moderately deep Garlock Variant cobbly loamy sand overlying basalt at greater depths. Included areas make up about 15 percent of the total acreage.

The Sparkhule soil is shallow and well drained. It formed in residuum from basalt and basaltic scoria. Typically, the surface layer is yellowish brown very stony loamy fine sand and gravelly sandy loam about 6 inches thick. The subsoil is strong brown gravelly and stony clay loam about 13 inches thick. There is a lithic contact with hard fractured basalt at 19 inches depth.

Permeability of the Sparkhule soil is moderately slow. Available water capacity is 1.8 to 2.4 inches to a depth of 20 inches. Effective rooting depth is 14 to 20 inches. Runoff is medium and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

Lava Flows consist of jagged, fractured, dark-colored to black rock outcrops.

Areas of this complex are used for military reservation and rangeland.

This unit is poorly suited for rangeland. The production of vegetation suitable for livestock grazing is limited by stones and cobbles on the soil surface. This produces lower yields. Livestock management is limited to proper grazing use. The characteristic plant associations on this unit are Creosote bush, Rabbit Bush, and Burro weed.

Capability Subclass	Storie Index
VIIe nonirrigated	13

241 -- Stumble loamy coarse sand, 15 to 30 percent slopes. This deep, somewhat excessively drained higher elevation soil is on lower rhyolitic dome toeslopes, ash-covered granitic upland sideslopes, and upland valleys. It formed in alluvium drived from welded rhyolitic and andesitic tuff and volcanic ash deposits, which include other pyroclastics such as obsidian and perlite. Many areas are dissected by shallow, moderately spaced drainageways. Areas are irregular in shape and range in size from 34 to 282 acres. Vegetation is desert shrubs, grasses, forbs, and Joshua trees. Elevation is 4800 to 5400 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is about 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

Typically, the surface layer is pale brown loamy coarse sand about 4 inches thick. The underlying material is pale brown loamy sand and loamy coarse sand to a depth of 60 inches or more.

Included with this unit are areas of Stumble loamy coarse sand overlying welded tuff at 40 to 60 inches depth occurring on similar positions in the landscape. It makes up about 15 percent of the total acreage. Also included are small areas of Shoken stony, sandy loam on granitic sideslopes.

Permeability of this Stumble soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is medium and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation. This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by a sandy surface texture. Soil blowing due to removal of plant cover results in soil loss and deterioration of the existing vegetation. The preservation of a protective plant cover and proper grazing use are management practices suited for use on this unit. The characteristic plant associations on this unit are Shadscale, Rabbit Bush, and Joshua tree.

Capability Subclass: VIIe nonirrigated
Storie Index: 42

242 -- Stumble, loamy, coarse sand, 2 to 15 percent slopes. This deep, somewhat excessively drained soil is on alluvial fans in upland higher elevation valleys. It formed in alluvium derived from mixed sources, including rhyolitic tuff and volcanic ash deposits, and other pyroclastics. Slopes are plane to slightly convex. Areas are irregular in shape and are 56 to 1501 acres in size. The vegetation is mainly desert shrubs, grasses, forbs, and Joshua trees. Elevation ranges from 4800 to 5200 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is about 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

Typically, the surface layer is pale brown loamy coarse sand about 4 inches thick. The underlying material is pale brown loamy sand and loamy coarse sand to a depth of 60 inches or more.

Included with this unit are areas of Haybourne loamy sand on similar positions in the landscape. It occupies about 10 percent of the total acreage. Also included are small, internally drained playa areas in basin positions.

Permeability of this Stumble soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation. There are also some pumice mines located on this unit.

This soil is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures. Soil blowing due to removal of plant cover results in soil loss and deterioration of the existing vegetation. The preservation of a

protective plant cover and proper grazing use are management practices suited for use on this unit. The characteristic plant associations on this soil are Shadscale, Rabbit Bush, Bud Sagebrush, Four-winged Saltbush, and Joshua tree.

Capability subclass: VIIe nonirrigated

Storie Index: 50

240 -- Stumble loamy, coarse sand, 30 to 50 percent slopes. This deep, somewhat excessively drained soil is on sideslopes of rhyolitic domes and granitic uplands of the Coso Range. It formed in rhyolitic and andesitic tuff, and volcanic ash deposits, which include other pyroclastics such as obsidian and perlite. Slopes are plane to convex and are dissected by shallow to moderately deep, moderately spaced drainageways. Areas are irregular in shape, and are 136 to 798 acres in size. Vegetation is desert shrubs, grasses, and forbs. Elevation is 4800 to 5600 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is about 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

Typically, the surface layer is pale brown loamy coarse sand about 4 inches thick. The underlying material is pale brown loamy sand and loamy coarse sand to a depth of 60 inches or more.

Inlcuded in this unit are areas of Stumble loamy coarse sand overlying welded tuff at 20 to 60 inches depth in similar positions. It constitutes about 15 percent of the total acreage. Also included are small areas of Shoken stony sandy loam on upper granitic sideslopes.

Permeability of this Stumble soil is rapid, and available water capacity to a depth of 60 inches is 3.0 to 4.2 inches. Runoff is medium to rapid and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for range, wildlife habitat, and military reservation.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by steep slopes. Steep slopes are difficult to graze, and erosion resulting in soil loss may occur if overgrazed. Adequate cover should be left on the soil to

control soil blowing and water erosion. Trails or walkways can be constructed in places to encourage livestock grazing in areas where access is limited. The characteristic plant associations on this unit are Shadscale and Rabbit Bush.

Capability Subclass: VIIe nonirrigated
Storie Index: 24

233 -- Stumble - Shoken complex, 15 to 30 percent slopes. This complex is on recent alluvial fans and uplands overlying granite bedrock. Areas are irregular in shape and are 32 to 267 acres in size. The natural vegetation is mainly desert shrubs, grasses, and forbs, and some Joshua trees. Elevation is 4800 to 5200 feet. The annual precipitation is about 7 to 8 inches, the average annual air temperature is about 54 to 56°F (12 to 13°C), and the frost-free season is 210 to 220 days.

This complex is 50 percent Stumble loamy coarse sand and 40 percent Shoken stony sandy loam. Stumble loamy coarse sand is on recent alluvial fans on sideslopes of granitic and andesitic upland areas. Shoken stony sandy loam also occurs on upper granitic sideslopes. The components of this complex are so intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Stumble loamy coarse sand overlying welded tuff at 20 to 60 inches depth intermingled with the soils of this unit. Also included are small areas of granitic rock outcrops.

The Stumble soil is deep and somewhat excessively drained. It formed in rhyolitic and andesitic tuff and volcanic ash deposits. Typically, the surface layer is pale brown loamy coarse sand about 4 inches thick. The underlying material is pale brown loamy sand and loamy coarse sand to a depth of 60 inches.

Permeability of this Stumble soil is rapid. Available water capacity is 3.0 to 4.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Shoken soil is shallow to very shallow and somewhat excessively drained. It formed in residual material weathered from granite and granitic colluvium. Typically, the surface layer is pale brown stony sandy

loam about 3 inches thick. The underlying material is weathered granite crushing to sandy loam to a depth of 15 inches. Depth to bedrock ranges from 10 to 25 inches.

Permeability of this Shoken soil is rapid. Available water capacity to a depth of 3 inches is .05 to .07 inches. Effective rooting depth is 3 to 15 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

Areas of this unit are used for wildlife habitat and military reservation. The characteristic plant associations on this unit are Rabbit Bush and Joshua tree.

	Capability Subclass	Storie Index
Stumble Shoken	VIIe nonirrigated	18

135 -- Wasco Variant very fine sandy loam, 0 to 2 percent slopes. This deep, well-drained soil is on lower, slightly older alluvial fans and valley fill material. It formed in mixed alluvium, but predominantly from granitic rocks. The soil has a weakly silica-cemented substratum at 15 to 20 inches depth. The soil occurs mainly in one irregularly shaped area of about 1270 acres in size. Most areas are dissected by shallow, widely spaced drainageways. The vegetation is desert shrubs, grasses, and forbs. Elevation is 3350 to 3475 feet. The annual precipitation is about 5 to 6 inches, the average annual air temperature is about 57°F (14°C), and the frost-free season is 220 to 230 days.

Typically, the surface layer is light yellowish brown very fine sandy loam about 5 inches thick. The subsurface layer is pale brown coarse sandy loam about 10 inches thick. The underlying material is light yellowish brown weakly cemented loamy coarse sand about 36 inches thick underlain by pale brown loamy coarse sand to a depth of 72 inches. Depth to the weakly cemented horizon ranges from 15 to 20 inches. Depth to carbonates is 15 inches.

Included with this unit are areas of Dunmovin loamy coarse sand intermingled with the soils of this unit. Also included are areas of Lavic loamy sand occurring on stratified valley fill materials near the eastern boundary of the map unit. Included areas each make up about 10 percent of the total acreage.

Permeability of this Wasco Variant soil is moderately slow. The available water capacity is 4.0 to 5.2 inches to a depth of 60 inches. Effective rooting depth is 60 inches or more. Runoff is very slow, and the erosion hazard by water is slight. The hazard of soil blowing is moderate.

This unit is used for range and wildlife habitat. The Coso Junction (Cal Trans) rest stop is on this unit.

This unit is poorly suited for use as rangeland. The production of vegetation suitable for livestock grazing is limited by sandy surface textures. Soil blowing resulting in soil loss and deterioration of existing vegetation occurs if the plant cover is removed or overgrazed. Leaving adequate vegetative cover on this soil is a management practice suited for use on this unit. The characteristic plant associations on this soil are Shadscale, Allscale, and Bud Sagebrush.

Capability Subclass: VIIs nonirrigated
Storie Index: 67

7.0 MANAGEMENT AND INTERPRETATION TABLES

Soils management and interpretation tables are presented in this section. They are:

a) Table 7-1. Acreage and Proportionate Extent of Map Units

b) Table 7-2. Acreage and Proportionate Extent of Soils Series

c) Table 7-3. Soil Taxonomic Classifications

d) Table 7-4. Interpretive Ratings for Selected Soil Properties and Qualities

e) Table 7-5. Interpretive Ratings for Soil Uses

f) Table 7-6. Engineering Properties of Soils

TABLE 7-1. ACREAGE AND PROPORTIONATE EXTENT OF MAP UNITS

Map Symbol	Area (Acres)	% of Total
101	113	0.15
104	2,150	2.86
105	12,317	16.40
106	1,203	1.60
107	2,121	2.82
108	584	0.78
110	138	0.18
111	214	0.28
120	2,174	2.89
121	453	0.60
130	11,901	15.85
131	3,488	4.64
133	362	0.48
135	1,270	1.69
140	1,813	2.41
141	3,142	4.18
142	3,397	4.52
150	671	0.89
155	315	0.42
160	3,895	5.19
170	835	1.11
180	4,631	6.17
181	3,164	4.21
182	251	0.33
183	249	0.33
190	675	0.90
220	1,747	2.33
221	727	0.97
222	1,332	1.77

TABLE 7-1. ACREAGE AND PROPORTIONATE EXTENT OF MAP UNITS (Concluded)

Map Symbol	Area (Acres)	% of Total
223	845	1.13
232	879	1.17
233	460	0.61
234	3,302	4.40
240	1,248	1.66
241	707	0.94
242	2,318	3.09
	75,091	99.97

TABLE 7-2. ACREAGE AND PROPORTIONATE EXTENT OF SOIL SERIES

Series/Land Type	Area (Acres)	% of Total
Alko Variant	2,123	2.8
Arizo	695	0.9
Coso	6,548	8.7
Coso Variant	1,118	1.5
Dunmovin	15,970	21.3
Dunmovin Variant	1,643	2.2
Garlock	96	0.1
Garlock Variant	1,614	2.1
Gass Variant	873	1.2
Haiwee	2,134	2.8
Haiwee Variant	308	0.4
Haybourne	941	1.3
Hooten Variant	450	0.6
Joshua Variant	1,328	1.8
Lavic	2,670	3.6
Maynard Lake	8,208	10.9
Nebona Variant	2,191	2.9
Shoken	1,686	2.2
Sparkhule	780	1.0
Stumble	4,166	5.5
Wasco Variant	1,016	1.4
Lithic Torriorthents, loamy-skeletal, mixed, mesic	495	0.7
Lithic Torripsamments, mixed, thermic	339	0.5
Torriorthents	584	0.8
Inclusions in Map Units	4,912	6.5
Cinder Land	807	1.1
Rubble Land/Rock Outcrops	9,546	12.7
Lava Flows	1,078	1.4
Playas	572	0.8
Riverwash	200	0.3
	75,091	100.0

TABLE 7-3. SOIL TAXONOMIC CLASSIFICATIONS

Alko Variant	Clayey, montmorillonitic, thermic, shallow Typic Nadurargids
Arizo	Sandy-skeletal, mixed, thermic Typic Torriorthents
Coso	Loamy-skeletal, mixed, nonacid, thermic, shallow Xeric Torriorthents
Coso Variant	Loamy-skeletal, mixed, nonacid, thermic Xeric Torriorthents
Dunmovin	Mixed, thermic Typic Torripsamments
Dunmovin Variant	Mixed, thermic Durorthidic Torripsamments
Garlock	Fine-loamy, mixed, thermic Typic Haplargids
Garlock Variant	Fine, montmorillonitic, thermic Typic Haplargids
Gass Variant	Fine, montmorillonitic, thermic Typic Natrargids
Haiwee	Loamy-skeletal, mixed, nonacid, thermic Lithic Xeric Torriorthents
Haiwee Variant	Loamy-skeletal, mixed, nonacid, mesic Lithic Xeric Torriorthents
Haybourne	Coarse-loamy, mixed, mesic Xerollic Camborthids
Hooten Variant	Loamy-skeletal, mixed, thermic, shallow Entic Durorthids
Joshua Variant	Fine-loamy, mixed, thermic Duric Haplargids
Lavic	Coarse-loamy, mixed, thermic, Typic Calciorthids
Maynard Lake	Mixed, thermic Typic Torripsamments
Nebona Variant	Sandy, mixed, thermic, shallow Typic Durorthids
Shoken	Loamy-skeletal, mixed, nonacid, mesic, shallow Xeric Torriorthents
Sparkhule	Loamy-skeletal, mixed, thermic Lithic Haplargids
Stumble	Mixed, mesic Typic Torripsamments
Wasco Variant	Coarse-loamy, mixed, thermic Durorthidic Torriorthents

UNITED STATES
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Table 7-4: **INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES**

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	in/in (10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
155	AR120 BYV-LS 2-5%	>60	>20	very slow	excessive	none	--	> 60	.03-.05	5-6			slight (water) high (wind)		none	7.9-8.4	low

Remarks

(Instructions on reverse)

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Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
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INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.) in./in.	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH inches	PERMEABILITY in/hr.	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
130	COSO ST-SL 30-50%	8-20 to granite	2.0-6.0	medium to rapid	somewhat excessive	bedrock	--	8-20 to bedrock	.05-.07	6-7			high		none	7.4-8.4	low
	rock outcrop	none	none	very rapid	excessive	bedrock	--	none	nil	6-7			none		none	--	--
	Haiwee STV-SL 30-50%	8-20 to granite	2.0-6.0	medium to rapid	somewhat excessive	bedrock	--	8-20 to bedrock	.04-.06	6-7			high		none	7.9-8.4	low
131	COSO ST-SL 15-50%	8-20 to granite	2.0-6.0	medium to rapid	somewhat excessive	bedrock	--	8-20 to granite	.05-.07	6-7			high		none	7.4-8.4	low
	rock outcrop	none	none	very rapid	excessive	bedrock	--	none	nil	6-7			none		none	--	--
	COSO variant STV-SL 15-30%	20-60 to granite	0.6-2.0	medium	well drained	bedrock	--	20-60 to granite	.04-.06	6-7			moderate		none	7.4-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
105	Dunmovin LCOS 0-5%	>60	6.0-20	very slow to slow	somewhat excessive	none	none	>60	.05-.07	5-7			slight (water) high (wind)	slight (water) high (wind)	none	7.8-8.4	low
106	Dunmovin LCOS 5-9%	60	6.0-20	slow to medium	somewhat excessive	none	none	>60	.05-.07	5-6			slight to moderate (water) high (wind)		none	7.4-8.4	low
104	Dunmovin RY-LCOS 5-9%	60	6.0-20	slow to medium	somewhat excessive	none	none	>60	.05-.07	5-6			slight to moderate		none	7.4-8.4	low
108	Dunmovin LCOS 0-2%	60	6.0-20	very slow	somewhat excessive	none	none	>60	.05-.07	5-6			slight (water) high (wind)		none	7.4-8.4	low
	LAVIC LS 0-2%	60	0.6-2.0	very slow	well drained	none	none	>60	0-5"=.06 -.08 5-20"=.11 -.13 20-60"=.12 -.14	5-6			slight (water) high (wind)		none	7.4-9.0	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
		inches	in/hr														
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
101	Garlock CB-LCOS 9-15%	>60	0.2-0.6	medium	well drained	none	none	>60	0-6"= .05-.07 6-30"= .05-.07	5-6			moderate		none	7.0-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
		inches	in./hr.														
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
120	Garlock Variant CO-LS 5-15%	26-40" over basalt and cinders	0.2-0.6	slow to med.	well drained	26-40" to basalt and cinders	-	26-40"	0.6" = .05-.07 6-32= .19-.21	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low
	Dunmovin COS. 5-15%	>60	>20	very slow	excessive	none	none	>60	.04-.06	5-6			slight (water) high (wind)		none	7.4-8.4	low
	Rock Outcrop	none	none	very rapid	excessive	bedrock	-	none	nil	5-6			none		none	-	-
121	Garlock Variant CO-LS 5-15%	26-40" over basalt and cinders	0.2-0.6	slow to med.	well drained	26-40" to basalt and cinders	-	26-40"	0-6"= .05-.07 6-32= .19-.21	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low
	Dunmovin LCOS. 5-15%	>60	6.0-20	slow to med	somewhat excessive	none	-	>60	.05-.07	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH inches	PERMEABILITY in/hr	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
220	Gass Variant CB-FSL 5-15%	20-40 to basalt and cinders	0.06-0.2	slow to med.	well drained	bedrock	-	20-40 to basalt and cinders	0-5" = .09-.11 5-23" = .13-.15 23-40" = .10-.12	5-6			slight to mod.		none	7.9-8.4	low
	Garlock Variant CB-LS 5-15%	26-40 over basalt and cinders	0.2-0.6	slow to med	well drained	26-40 to basalt and cinders	-	26-40	0-6" = .05-.07 6-37" = .19-.21	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
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INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
170	Haybourne LS 5-15%	>60	2.0-6.0	slow to med.	well drained	none	none	>60	0-9" = .06-.08 9-60" = .11-.13	7-8			slight to mod. (water) high (wind)		none	7.0-7.8	low

Remarks

(Instructions on reverse)

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Table 7-4 (continued)

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INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
182	Hooten BY-LFS 5-15%	8-20" to hard-pan	<.06	slow to med.	well drained	hard-pan	4	8-20"	0-11" = .05-.07 11-16"= hardpan 15-60"= .04-.06	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low
183	Hooten LCOS 5-9%	8-20" to hard-pan	<.06	slow to med.	well drained	hard-pan	4	8-20	0-11" = .10-.12 11-15"= hardpan 15-60"= .05-.07	5-6			slight to mod. (water) high (wind)		none	7.4-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.) in/in	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH inches	PERMEABILITY in/hr	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
150	Joshua Variant SL 2-5%	>60	0-6-2.0	slow	well drained	none	none	>60	0-11"= .12-.14 11-60"= .03-.05	5-6			slight (water) mod. (wind)		none	6.6-7.8	low
	Arizo BYV-LS 2-5%	>60	>20	very slow	excessive	none	none	>60	.03-.05	5-6			slight (water) high (wind)		none	7.4-8.4	low
	Lavic LS 2-5%	>60	0.6-2.0	slow	well drained	none	none	>60	0-5" = .06-.08 5-20"= .11-.13 20-60"= .12-.14	5-6			slight (water) high (wind)		none	7.4-9.0	low
190	Joshua Variant SL 2-30%	>60	0.6-2.0	slow to med.	well drained	none	none	>60	0-11"= .09-.11 11-60"= .05-.07	5-6			slight to mod.		none	6.6-7.8	low
	Nebona Variant CB-LS 2-30%	8-15	<.06	slow to rapid	well drained	hardpan	not known	8-15 hardpan		5-6			slight to mod.		none	7.9-8.4	low

Remarks

(Instructions on reverse)

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Table 7-4 (continued)

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INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.) in/in	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
107	Lavic LS 0-2%	>60	0.6-2.0	very slow	well drained	none	none	>60	0-5"= .06-.08 5-20"= .11-.13 20-60"= .12-.14	5-6			slight (water) high (wind)		none	7.4-9.0	low
	Dunmovin LCOS 0-2%	>60	6.0-2.0	very slow	somewhat excessive	none	none	>60	.05-.07	5-6			slight (water) severe (wind)		none	7.9-8.4	low
	Playa	not rated	<.06	intermittent ponding	very poor	not rated	-	not applicable	not rated	5-6			not applicable		annually	7.9-9.5	not applicable

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
		inches	in/hr														
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
141	Maynard Lake LCOS 15-30%	>60	6.0-20	medium	somewhat excessive	none	none	>60	.05-.07	5-6			moderate (water) high (wind)		none	7.4-8.4	low
142	Maynard Lake LCOS 2-15%	>60	6.0-20	slow to medium	somewhat excessive	none	none	>60		5-6			slight to moderate (water) high (wind)		none	7.4-8.4	low
140	Maynard Lake LCOS 30-50%	>60	6.0-20	medium to rapid	somewhat excessive	none	none	>60		5-6			high (water) high (wind)		none	7.4-8.4	low
133	Maynard Lake LCOS 15-30%	>60	6.0-20	medium	somewhat excessive	none	none	>60		5-6			moderate		none	7.4-8.4	low
	COSO ST-SL 15-30%	8-20 to granite	2.0-6.0	medium	somewhat excessive	bedrock	--	8-20 to granite	.05-.07	5-6			moderate		none	7.4-8.4	low

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH inches	PERMEABILITY in/hr	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
180	Nebona variant CB-LS 5-30%	8-15	<.06	medium to rapid	well drained	hard-pan	not known	8-15" to hardpan	0-6"= .09-.11 6-8"= .12-.14	5-6			moderate to high		none	7.9-8.4	low
	ALKO variant CB-LS 5-30%	8-20	<.06	medium to rapid	well drained	hard-pan	not known	8-20" to hardpan	0-6"= .05-.07 6-18"= .12-.14	5-6			moderate to high		none	7.4-8.4	low

Remarks

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
232	Rock Outcrop	none	none	very rapid	excessive	bedrock	-	none	nil	7-8			none		none	-	-
	Haiwee Variant STV-L 30-50%	10-20" to andesite	0.6-2.0	med. to rapid	somewhat excessive	bedrock	-	10-20" to andesite	10-12 20/200 20/240	7-8			high		none	7.5-8.4	low

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH (in.)	PERMEABILITY	RUN-OFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
160	Rubble Land	stones	-	-	excessive	stones				5-8			-	-	none	-	-
	Torriorthents 30-75%	20-40	2.0-6.0	med. to rapid	excessive	bedrock	20-40	20-40		5-8			mod. to high		none	7.4-8.4	low
	Rock Outcrops	bedrock	-	-	excessive	bedrock	-	-		5-8			-		none	-	-

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
234	Shoken ST-SL 30-50% slopes	3-15 to granite	6.0-20	med. to rapid	somewhat excessive	bedrock	-	3-15 to bedrock	.05-.07	7-8			mod. to high (water) mod. (wind)		none	7.4-8.4	low
	Rock Outcrop	none	none	very rapid	excessive	bedrock	none	nil		7-8			none		none	-	-

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
		inches															
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
221	Sparkhule STV-LFS 5-30%	14-20 to basalt	0.2-0.6	med.	well drained	14-20 to bedrock	6-14	14-20	0-6"=.09-.11 6-19"=.10-.12	5-6			moderate		none	7.9-8.4	low
	Lava flows	none	none	very rapid	excessive	bedrock	--	none		5-6			none		none	--	--

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
241	Stumble LCOS 15-30%	>60	6.0-20	medium	somewhat excessive	none	none	>60	.05-.07	7-8			moderate (water) high (wind)		none	7.4-8.4	low
242	Stumble LCOS 2-15%	>60	6.0-20	slow to medium	somewhat excessive	none	none	>60	.05-.07	7-8			slight to moderate (water) high (wind)		none	7.4-8.4	low
240	Stumble LCOS	>60	6.0-20	medium to rapid	somewhat excessive	none	none	>60	.05-.07	7-8			high (water) high (wind)		none	7.4-8.4	low
233	Stumble LCOS 15-30%	>60	6.0-20	medium	somewhat excessive	none	none	>60	.05-.07	7-8			moderate (water) high (wind)		none	7.4-8.4	low
	Shoken ST-SL 15-30%	3-15to bedrock	6.0-20	medium	excessive	bedrock	--	3-15to bedrock	.05-.07	7-8			moderate		none	7.4-8.4	low

Remarks

(Instructions on reverse)

Form 7310-21 (August 1973)

Table 7-4 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

MAP SYMBOL	SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)		EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
		DEPTH inch	PERMEABILITY in/hr	RUNOFF	DRAINAGE	KIND	THICKNESS (In.)			ANNUAL	EFFECT	CONDITION	SUSCEPTIBILITY (Class)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
135	WASCO variant VFSL 0-2%	>60	0.2-0.6	very slow	well drained	weak cement sub-soil	36	>60	0-5"=.15 -.17 5-15"= .10-.12 15-72"= .05-.07	5-6			slight (water) moderate (wind)		none	7.9-8.4	low
181	Dunmovin variant LS 2-9%	>60	0.2-0.6	slow to medium	somewhat excessive	weak cement sub-soil	14	>60	.05-.07	5-6			slight (water) high (wind)		none	7.4-8.4	low
	Alko variant CB-LS 2-9%	8-20	<.06	slow to medium	well drained	hard-pan	not known	8-20	0-6"= .05-.07 6-18"= .12-.14	5-6			slight to moderate		none	7.4-8.4	low
	Nebona variant 2-9%	8-15	<.06	slow to medium	well drained	hard-pan	not known	8-15 to hard-pan	0-6"= .05-.07 6-8"= .12-.14	5-6			slight to moderate		none	7.9-8.4	low

Remarks

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

TABLE 7-5: INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
155	AR120 BYV-LS 2-5%	not suited	limited boulders droughty slope	poor boulders stones	poor boulders stones	poor boulders stones	

(Continued on reverse)

155	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES without basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
AR120 BYV-LS 2-5%	severe seepage	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders poor filter	severe seepage	severe boulders seepage	severe boulders stones	severe boulders stones	

GENERAL INSTRUCTIONS

Soil Scientist and Natural Resource Specialist prepares in *triplicate*. File original in District Office. Submit copies to State Office and Service Center (350). (See BLM Manual 7312)

SPECIFIC INSTRUCTIONS

Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
130	COSO ST-SL 30-50%	not suited	limited stones depth to rock slope	poor thin layer slope	improbable source thin layer	poor thin layer slope	
	Rock out-crop	not suited (all columns)	--	--	--	--	
	Haiwee STV-SL 30-50%	not suited	limited depth to rock slope	poor thin layer slope	improbable source thin layer	poor thin layer slope	
131	COSO ST-SL 15-50%	not suited	limited depth to rock slope	poor thin layer slope	improbable source thin layer	poor thin layer slope	
	rock out-crop	not suited (all columns)	--	--	--	--	
	CASO vari-ant STV-SL 15-30%	not suited	limited stones slope	poor stones slope	improbable source thin layer excess fines	fair to poor thin layer stones slope	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
130	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
COSO ST-SL 30-50%	severe depth to rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	severe slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	
rock outcrop	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Haiwee STV-SL 30-50%	severe depth to rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	severe slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	
131															
COSO ST-SL 15-50%	severe depth rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	moderate 15-25% slope severe 25-50% slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	
rock outcrop	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

GENERAL INSTRUCTIONS

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SPECIFIC INSTRUCTIONS

Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY

Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
105	Dunmovin LCOS 0-5%	not suited	limited droughty fast intake possible soil blowing slope	fair too sandy	probable source sand improbable gravel excess fines	good	
106	Dunmovin LCOS 5-9%	not suited	limited droughty fast intake possible soil blowing slope	fair too sandy	probable source sand improbable gravel excess fines	good	
104	Dunmovin BY-LCOS 5-9%	not suited	limited boulders droughty fast intake slope	poor boulders	probable source sand improbable gravel excess fines	good	
108	Dunmovin LCOS 0-2%	not suited	limited droughty fast intake possible soil blowing	fair too sandy	probable source sand improbable gravel excess fines	good	
	LAVIC LS 0-2%	not suited	limited fast intake	good	improbable source excess fines	fair moderate shrink-swell	

(Continued on reverse)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

105	PONDS		ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	AREAS			PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	LOCATION	EMBANKMENT				CAMP	PICNIC	PLAY							
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Dunmovin LCOS 0-5%	severe seepage	severe seepage	slight	severe cave-in	slight	moderate too sandy	moderate too sandy	moderate slope too sandy	moderate too sandy	severe poor filter	severe seepage	moderate too sandy	moderate droughty too sandy	moderate droughty too sandy	
106															
Dunmovin LCOS 5-9%	severe seepage	severe seepage	slight	severe cave-in	slight	moderate slope too sandy	moderate too sandy	severe slope	moderate too sandy	severe poor filter	severe seepage slope	moderate slope too sandy	moderate droughty too sandy	moderate droughty too sandy	
104															
Dunmovin BY-LCOS 5-9%	severe seepage	severe seepage	moderate boulders	severe cave-in	moderate boulders	moderate slope too sandy	moderate too sandy	severe slope	moderate boulders too sandy	severe poor filter	severe seepage slope	moderate slope too sandy boulders	moderate boulders droughty too sandy	moderate boulders droughty too sandy	
108															
Dunmovin LCOS 0-2%	severe seepage	severe seepage	slight	severe cave-in	slight	moderate too sandy	moderate too sandy	moderate too sandy	moderate too sandy	severe poor filter	severe seepage	moderate too sandy	moderate droughty too sandy	moderate droughty too sandy	
LAVIC LS 0-2%	moderate seepage	slight	moderate shrink-swell	slight	moderate shrink-swell	slight	slight	slight	slight	moderate percs slowly	moderate seepage	slight	slight	slight	

GENERAL INSTRUCTIONS

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SPECIFIC INSTRUCTIONS

Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY

Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
101	Garlock CB-LCOS 9-15%	not suited	limited slope	fair, too clayey stony slope	improbable source of sand and gravel excess fines	fair moderate shrink-swell subsoil	

(Continued on reverse)

Form 7310-23 (August 1973)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
101	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Garlock CB-LCOS 9-15%	severe slope	slight	moderate slope shrink-swell	moderate slope	moderate slope shrink-swell	moderate slope permeability too sandy	moderate slope too sandy small stones	severe slope small stones too sandy permeability	moderate too sandy	severe moderate slow permeability	severe slope seepage	moderate slope	moderate slope	moderate slope	

GENERAL INSTRUCTIONS

Soil Scientist and Natural Resource Specialist prepares in *triplicate*. File original in District Office. Submit copies to State Office and Service Center (350). (See BLM Manual 7312)

SPECIFIC INSTRUCTIONS

Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
120	Garlock variant CO-LS, 5-15%	not suited	limited fast intake depth to rock slope	fair too clayey slope	improbable source excess fines	poor 26-40" to bedrock	
	Dunmovin COS, 5-15%	not suited	limited droughty fast intake soil blowing slope	poor, too sandy	probable source (sand) improbable source (gravel) excess fines	good	
	Rock outcrop	not suited (all columns)	--	--	--	--	
121	Garlock variant CO-LS 5-15%	not suited	limited fast intake depth to rock slope	fair, too clayey slope	improbable source excess fines	poor 26-40" to bedrock	
	Dunmovin LCOS 5-15%	not suited	limited droughty fast intake soil blowing slope	fair too sandy slope	probable source (sand) improbable source (gravel) excess fines	good	

(Continued on reverse)

120	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES without basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
Garlock sev-variant ere CB-LS slope 5-15%	moderate thin layer	moderate depth to rock slope shrink-swell	severe depth to rock slope	moderate depth to rock	moderate slope percs slowly	moderate slope percs slowly	severe slope	slight	severe depth to rock	severe depth to rock slope	severe depth to rock	moderate slope depth to rock	moderate slope depth to rock		
Dunmovin sev- COS ere 5-15% seepage slope	severe seepage	moderate slope	severe cave-in	moderate slope	moderate slope too sandy	severe too sandy	severe slope too sandy	severe too sandy	severe poor filter	severe seepage slope	severe seepage too sandy	severe too sandy	severe too sandy		
Rock basalt outcrop	--	--	--	--	--	--	--	--	--	--	--	--	--		
121															
Garlock sev-variant slope CB-LS 5-15%	moderate thin layer	moderate depth to rock slope shrink-swell	severe depth to rock slope	moderate depth to rock	moderate slope percs slowly	moderate slope percs slowly	severe slope	slight	severe depth to rock	severe depth to rock slope	severe depth to rock	moderate slope depth to rock	moderate slope depth to rock		
Dunmovin sev- LCOS ere 5-15% seepage slope	severe seepage	moderate slope	severe cave-in	moderate slope	moderate slope too sandy	moderate slope too sandy	severe slope	moderate too sandy	severe poor filter	severe seepage slope	severe seepage	moderate too sandy slope droughty	moderate too sandy slope droughty		

GENERAL INSTRUCTIONS

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
220	Gass Variant CB-FSL 5-15%	not suited	limited perc slowly depth to rock, slope	poor, too clayey 20-48 in. to bedrock	improbable source excess fines	poor high shrink-swell	
	Garlock Variant CB-LS 5-15%	not suited	limited fast intake depth to rock, slope	fair, too clayey slope	improbable source excess fines	poor 26-40" to bed-rock	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
220 Gas Variant CB-FSL 5-15% severe slope	mod. thin layer	severe shrink-swell	severe depth to rock	severe shrink-swell	mod. perc slowly slope	moderate slope	severe slope	slight	severe percs slowly depth to rock	severe depth to rock slope	severe depth to rock	severe depth to rock	mod. slope depth to rock	mod, slope depth to rock	
Garlock Variant CB-LS 5-15% severe slope	mod. thin layer	mod. depth to rock shrink-swell slope	severe depth to rock	mod. depth to rock	mod. slope percs slowly	mod. slope percs slowly	severe slope	slight	severe depth to rock	severe depth to rock slope	severe depth to rock	severe depth to rock	mod. slope depth to rock	mod. slope depth to rock	

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SUITABILITY
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DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
170	Haybourne LS 5-15%	not suited	limited fast intake soil blowing slope	fair slope	improbable source excess fines	good	

(Continued on reverse)

Form 7310–23 (August 1973)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
PONDS					AREAS									
LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
170 Haybourne LS 5-15% severe seepage slope	slight to mod. seepage	moderate slope	mod. slope	mod. slope	mod. slope	mod. slope	severe slope	slight	mod. slope	severe seepage slope	severe seepage	mod. slope	mod. slope	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
182	Hooten BY-LFS 5-15%	not suited	limited surface boulders percs slowly, depth to hardpan slope	poor surface boulders 8-20" to hardpan	improbable source surface boulders, 8-20" to hardpan	poor 2-20" to hardpan boulders on surface	
183	Hooten LCOS 5-15%	not suited	limited percs slowly depth to hardpan slope	poor 8-20" to hardpan	improbable source 8-20" to hardpan	poor 8-20" to hardpan	

(Continued on reverse)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
PONDS					AREAS									
LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
182 Hooten BY-LFS 5-15%														
severe 8-20" to hardpan slope	severe thin layer boulders	severe hardpan boulders	severe hardpan boulders	severe hardpan boulders	severe hardpan	severe percs slowly hardpan	severe slope hardpan percs slowly	mod. too sandy boulders	severe hardpan percs slowly	severe hardpan slope	severe hardpan	severe hardpan boulders	severe hardpan boulders	
183 Hooten LCOS 5-9%														
severe 8-20" to hardpan	severe thin layer	severe hardpan	severe hardpan	severe hardpan	severe hardpan	severe percs slowly hardpan	severe slope hardpan percs slowly	mod. too sandy	severe hardpan percs slowly	severe hardpan slope	severe hardpan	severe hardpan	severe hardpan	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
190	Joshua variant SL 2-30%	not suited	limited slope	fair to poor gravelly 2-30% slopes	probable source very gravelly	good to poor 2-30% slopes	
	Nebona variant CB-LS 2-30%	not suited	limited hardpan slope	poor 8-15" to hardpan	improbable source thin layer	poor 8-15" to hardpan	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Joshua variant SL 2-30%	moderate to severe seepage slope	severe seepage	slight to severe 2-30% slopes	slight to severe 2-30% slopes	moderate to severe shrink-swell 2-30% slopes	slight to severe 2-30% slopes	slight to severe 2-30% slopes	moderate to severe slope	slight to severe 2-30% slopes	severe poor filter 2-30% slopes	moderate to severe seepage 2-30% slopes	severe seepage 2-30% slopes	slight to severe 2-30% slopes	slight to severe 2-30% slopes	
Nebona variant CB-LS 2-30%	severe 8-15" to hardpan, 2-30% slope	severe 8-15"to hardpan	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	moderate too sandy slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	severe 8-15"to hardpan slope	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
150	Joshua variant SL 2-5%	not suited	limited slope	fair gravelly	improbable source gravelly	good soil below 11 inches depth	
	AR120 BYV-LS 2-5%	not suited	limited boulders droughty slope	poor boulders stones	poor boulders stones	poor boulders stones	
	LAVIC LS 2-5%	not suited	limited fast intake slope	good	improbable source excess fine	fair moderate shrink-swell	

(Continued on reverse)

150	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS		ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	AREAS			PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	LOCATION	EMBANKMENT				CAMP	PICNIC	PLAY							
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Joshua variant SC 2-5%	moderate seepage slope	severe seepage	slight	slight	moderate shrink-swell	slight	slight	moderate slope	slight	severe poor	moderate seepage	severe seepage	slight	slight	
AR120 2-5%	severe seepage	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders stones	severe boulders poor filter	severe seepage	severe boulders seepage	severe boulders stones	severe boulders stones	
LAVIC 2-5%	moderate seepage slope	slight	moderate shrink-swell	slight	moderate shrink-swell	slight	slight	moderate slope	slight	moderate percs slowly	moderate seepage slope	slight	slight	slight	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND / GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
107	Lavic LS 0-2%	not suited	limited fast intake	good	improbable source excess fines	fair moderate shrink-swell	
	Dunmovin LCOS 0-2%	not suited	limited droughty fast intake possible soil blowing	fair too sandy	probable source for sand improbable source for gravel, too sandy	good	
	Playa	not suited	not suited	not suitable	not a source	not suitable	

(Continued on reverse)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

PONDS					AREAS									
LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES without basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
107 Lavic LS, 0-2% moderate seepage	slight	mod. shrink-swell	slight	mod. shrink-swell	slight	slight	slight	slight	mod. percs slowly	mod. seepage	slight	slight	slight	
Dunmovin LCOS, 0-2% severe seepage	severe seepage	slight	severe cave-in	slight	mod. too sandy	mod. too sandy	mod. too sandy	mod. too sandy	severe poor filter	severe seepage	mod. too sandy	mod. too sandy droughty	mod. too sandy droughty	
Playa natural pond or small lake	not suitable, all columns													

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SUITABILITY

Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
141	Maynard Lake LCOS 15-30%	not suited	limited droughty fast intake possible soil blowing slope	poor, slope	probable source	fair, slope	
142	Maynard Lake LCOS 2-15%	not suited	limited droughty fast intake possible soil blowing slope	fair, too sandy	probable source	good	
140	Maynard Lake LCOS 30-50%	not suited	limited droughty fast intake possible soil blowing slope	poor, slope	probable source	poor, slope	

(Continued on reverse)

141	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES w/out basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
Maynard Lake LCOS 15-30%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	moderate too sandy slope	severe poor filter slope	severe seepage slope	severe slope	severe slope	severe slope	
142 Maynard Lake LCOS 2-15%	severe seepage, slope	severe seepage	moderate slope	severe cave-in	moderate slope	moderate slope too sandy	moderate slope too sandy	moderate 2-6% slope severe 6-15% slope	moderate too sandy	severe poor filter	severe seepage slope	moderate slope too sandy	moderate slope too sandy	moderate slope too sandy	
140 Maynard Lake LCOS 30-50%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	severe slope	severe slope	severe seepage slope	severe slope	severe slope	severe slope	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
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Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
133	Maynard Lake LCOS 15-30%	not suited	limited droughty fast intake possible soil blowing slope	poor, slope	probable source	fair	
	COSO ST-SL 15-30%	not suited	limited stones, slope	poor, stones slope	improbable source thin layer	fair to poor, thin layer, slope stones	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES w/out basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
Maynard Lake LCOS 15-30%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	moderate 15-25% slope severe 25-50% slope	severe poor filter slope	severe seepage slope	severe slope	severe slope	severe slope	
COSO ST-SL 15-30%	severe depth to rock, slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	moderate 15-25% slope severe 25-50% slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	

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SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
180	Nebona Variant CB-LS 5-30%	not suited	limited hardpan slope	poor 8-15" to hardpan	improbable source for sand and gravel, thin layer	poor 8-15; to hardpan	
	Alko Variant CB-LS 5-30%	not suited	limited hardpan slope	poor 8-20" to hardpan	improbable source excess fines	poor 8-20" to hardpan	

(Continued on reverse)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
PONDS					AREAS									
LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
180 Nebona Variant CB-LS, 5-30% severe 8-15" to hardpan, 5-30% slope	severe thin layer	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	mod. slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	severe 8-15" to hardpan slope	
Alko Variant CB-LS, 5-30% severe 8-20" to hardpan 5-30% slope	severe 8-20" to hardpan	severe 8-20' to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	mod. slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	severe 8-20" to hardpan slope	

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SUITABILITY

Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
232	Rock Outcrop	not suited	not suited	not suited	not suited	not suited	
	Haiwee Variant STV-L 30-50%	not suited	limited depth to rock slope	poor thin layer slope	improbable source thin layer	poor thin layer slope	

(Continued on reverse)

Form 7310-23 (August 1973)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

PONDS					AREAS									
LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
232 Rock Outcrop	-	-	-	-	-	-	-	-	-	-	-	-	-	
Haiwee Variant STV-L 30-50%														
severe depth to rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	severe slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	

GENERAL INSTRUCTIONS

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SPECIFIC INSTRUCTIONS

Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY

Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING

Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
160	Rubble Land	not suited	not suited	not suited	not suited	not suited	
	Torrior-thents 30-75%	not suited	limited stones depth to rock slope	poor stones slope	improbable source stones	poor stones slope	
	Rock Outcrop	not suited	not suited	not suited	not suited	not suited	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES without basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
160 Rubble Land	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Torriothents 30-75%	severe seepage slope	severe seepage stones	severe slope stones	severe depth to rock stones slope	severe slope depth to rock stones	severe slope stones	severe slope stones	severe stones slope	severe stones slope	severe depth to rock slope stones	severe depth to rock slope stones	severe depth to rock seepage slope stones	severe stones slope	severe stones slope	
Rock Outcrop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
234	Shoken ST-SL 30-50% slopes	not suited	limited depth to rock slope	poor thin layer slope	improbable source thin layer	poor thin layer slope	
	Rock Outcrop	not suited	not suited	not suited	not suited	not suited	

(Continued on reverse)

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
PONDS					AREAS									
LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES without basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
234 Shoken ST-SL 30-50%														
severe depth to rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	severe slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	
Rock Outcrop -	-	-	-	-	-	-	-	-	-	-	-	-	-	

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Column 1 MAP SYMBOL – A tie *must* be made between soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND / GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
221	Sparkhule STV-LFS 5-30%	not suited	limited stones depth to rock, slope	poor, thin layer stones slope	improbable thin layer stones	poor thin layer	
	Lava flows	not suited (all columns)	not suited	--	--	--	

(Continued on reverse)

221	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES w/ out basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
Sparkhule STV-LCS, 5-30%	severe depth to rock slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	slight to severe 5-30% slopes	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe thin layer slope	severe thin layer slope	
Lava Flows	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
241	Stumble LCOS 15-30%	not suited	limited droughty fast intake possible soil blowing slope	poor, slope	probable source	fair, slope	
242	Stumble LCOS 2-15%	not suited	limited droughty fast intake possible soil blowing slope	fair, too sandy	probable source	good	
240	Stumble LCOS 30-50%	not suited	limited droughty fast intake fast intake possible soil blowing slope	poor, slope	probable source	poor, slope	

(Continued on reverse)

Form 7310-23 (August 1973)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES w/out basements	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
241	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Stumble LCOS 15-30%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	moderate too sandy slope	severe poor filter slope	severe seepage slope	severe slope	severe slope	severe slope	
242 Stumble LCOS 2-15%	severe seepage, slope	severe seepage	moderate slope	severe cave-in	moderate slope	moderate slope too sandy	moderate slope too sandy	moderate 2-6% slopes severe 6-15% slopes	moderate too sandy	severe poor filter	severe seepage slope	moderate slope too sandy	moderate slope too sandy	moderate slope too sandy	
240 Stumble LCOS 30-50%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	severe slope	severe slope	severe seepage slope	severe slope	severe slope	severe slope	

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word "*unnamed*".

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND / GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
233	Stumble LCOS, 15-30%	not suited	limited droughty fast intake possible soil blowing slope	poor, slope	probable source	fair, slope	
	Shoken ST-SL 15-30%	not suited	limited depth to rock, slope	poor, thin layer, slope	improbable source thin layer	poor, thin layer, slope	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING													
	PONDS					AREAS								
	LOCATION	EMBANKMENT	ROAD LOCATION	SHALLOW EXCAVATIONS	BUILDING SITES	CAMP	PICNIC	PLAY	PATHS/ TRAILS	SEPTIC TANK ABSORPTION	SEWAGE LAGOONS	SANITARY LANDFILL (trench)	LAWNS AND GOLF FAIRWAYS	LANDSCAPE PLANTINGS	OTHER
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Stumble LCOS 15-30%	severe seepage, slope	severe seepage	severe slope	severe cave-in slope	severe slope	severe slope	severe slope	severe slope	moderate too sandy slope	severe poor filter slope	severe seepage slope	severe slope	severe slope	severe slope	
Shoken ST-SL 15-30%	severe depth to rock, slope	severe thin layer	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe slope depth to rock	severe slope depth to rock	severe slope depth to rock	moderate slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	severe depth to rock slope	

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

Table 7-5 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SOIL USES

MAP SYMBOL	SOIL NAME	SUITABILITY					
		DRYLAND FARMING	IRRI-GATION	TOPSOIL	SAND/ GRAVEL	ROAD FILL	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
135	WASCO variant VFSL 0-2%	not suited	favorable	fair thin layer	probable source sand improbable source gravel excess fines	good	
181	Dunmovin variant LS 2-9%	not suited	limited droughty fast intake possible soil blowing slope	fair thin layer	probable source sand improbable source gravel excess fines	good	
	ALKO variant CB-LS 2-9%	not suited	limited hardpan slope	poor 8-20" to hardpan	improbable source excess fines	poor 8-20" to hardpan	
	Nebona variant CB-LS 2-9%	not suited	limited hardpan slope	poor 8-15" to hardpan	improbable source for sand & gravel	poor 8-15" to hardpan	

(Continued on reverse)

	DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING														
	PONDS					AREAS									
	LOCATION (9)	EMBANKMENT (10)	ROAD LOCATION (11)	SHALLOW EXCAVATIONS (12)	BUILDING SITES without basements (13)	CAMP (14)	PICNIC (15)	PLAY (16)	PATHS/ TRAILS (17)	SEPTIC TANK ABSORPTION (18)	SEWAGE LAGOONS (19)	SANITARY LANDFILL (trench) (20)	LAWNS AND GOLF FAIRWAYS (21)	LANDSCAPE PLANTINGS (22)	OTHER (23)
WASCO variant VFSL, 0-2%	moderate seepage	severe seepage	slight	slight	slight	slight	slight	moderate percs slowly	slight	severe percs slowly	moderate seepage	slight	slight	slight	
181 Dunmovin variant LS 2-9%	moderate slope	severe seepage	slight	slight	slight	slight	slight	moderate 2-6% slope severe 6-9% slope	slight	severe percs slowly	moderate seepage	moderate too sandy	slight	slight	
ALKO variant CB-LS 2-9%	severe 8-20" to hard-pan	severe thin layer	severe cemented pan	severe cemented pan	severe cemented pan	severe depth to hardpan	severe depth to hardpan	severe depth to hardpan	slight	severe depth to hardpan	severe depth to hardpan	severe cemented pan	severe depth to hardpan	severe depth to hardpan	
Nebona variant CBLS 2-9%	severe 8-15" to hard-pan	severe thin layer	severe 8-15" to hardpan	severe 8-15" to hardpan	severe 8-15" to hardpan	severe 8-15" to hardpan	severe 8-15" to hardpan	severe 8-15" to hardpan	slight	severe 8-15"to hardpan	severe 8-15"to hardpan	severe 8-15"to hardpan	severe 8-15"to hardpan	severe 8-15"to hardpan	

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

SUITABILITY
Columns 3 through 8 – Rate soils according to the most limiting factor.

DEGREE OF LIMITATION AND SOIL FEATURES AFFECTING
Columns 9 through 22 – Enter appropriate soil limitation rating and description. The most limiting factor determines the degree of limitation for the use.

Column 23 OTHER – Enter kind of use and rating.

TABLE 7-6

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS

MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
155	AR120 RYV-LS 2-5%		>60	>60	A	low	low	low

(Continued on reverse)

Form 7310–22 (August 1973)

	CLASSIFICATION			COARSE FRACTION over 3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
	USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
155	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
AR120 BYV-LS 2-5%	0-60" BYV-LCOS	SP-SM	A-2	50-65	95-100	95-100	55-75	5-15	—	NP			

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SPECIFIC INSTRUCTIONS

(Columns not listed are self-explanatory)

Column 1 MAP SYMBOL – A tie *must* be made between the soil map and interpretive table for identification purposes.

Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

Column 22 ADDITIONAL PROPERTIES – Enter other soil properties that might be important to engineering.

GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDROLOGIC SOIL GROUP	SHRINK-SWELL POTENTIAL	CORROSIVITY	
			BEDROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CONCRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
130	COSO ST-SL 30-50%		8-20 to granite	none	D	low	high	low
	rock outcrop		0	none	D	none	none	none
	Haiwee STV-SL 30-50%		8-20 to granite or andesite	none	D	low	high	low
131	COSO ST-SL 15-50%		8-20 to granite	none	D	low	high	low
	rock outcrop		0	none	D	none	none	none
	COSO variant STV-SL 15-30%		20-60 to granite	none	B (40-60" depth) C (20-40" depth)	low	high	low

(Continued on reverse)

Form 7310-22 (August 1973)

	CLASSIFICATION			COARSE FRAGMENTS >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
	USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
130	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
COSO ST-SL 30-50%	0-8" ST-SL 8+" granite	SM --	A-1, A-2 --	35-50 --	75-95 --	70-90 --	40-60 --	20-35 --	-- --	NP --			
rock outcrop	rock outcrop	--	--	--	--	--	--	--	--	--			
Haiwee STV-SL 30-50%	0-10" GR-SL 10"+ granite	SM	A-1	35-50	55-70	50-65	30-45	15-25	--	NP			
131													
COSO ST-SL 15-50%	0-8" ST-SL 8"+granite	SM	A-2	45-60	75-95	70-90	40-60	20-35	--	NP			
Rock outcrop	rock outcrop	--	--	--	--	--	--	--	--	--			
COSO variant STV-SL	0-32" STV-L 32"+ weathered granite	SM --	A-4 --	55-65 --	60-70 --	55-65 --	45-60 --	35-50 --	20-30 --	5-10 --			

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SPECIFIC INSTRUCTIONS

(Columns not listed are self-explanatory)

Column 1 MAP SYMBOL – A tie *must* be made between the soil map and interpretive table for identification purposes.

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Column 22 ADDITIONAL PROPERTIES – Enter other soil properties that might be important to engineering.

GPO 849-603

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS

MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
105	Dunmovin LCOS 0-5%		>60	>60	A	low	moderate	low
106	Dunmovin LCOS 5-9%		>60	>60	A	low	moderate	low
104	Dunmovin BY-LCOS 5-9%		>60	>60	A	low	moderate	low
108	Dunmovin LCOS 0-2%		>60	>60	A	low	moderate	low
	Lavic LS 0-2%		>60	>60	B	moderate	very high	low

(Continued on reverse)

Form 7310-22 (August 1973)

105	CLASSIFICATION			COARSE FRACTION over 3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
	USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Dunmovin	0-72" LCOS	SM	A-2	0	95-100	95-100	50-60	10-20	--	NP			
106 Dunmovin LCOS 5-9%		SM	A-2	0	95-100	95-100	50-60	10-20	--	NP			
104 Dunmovin BY-LCOS 5-9%		SM	A-1	10-25	75-95	70-90	35-45	10-20	--	NP			
108 Dunmovin LCOS 0-2%		SM	A-2	0	95-100	95-100	50-60	10-20	--	NP			
LAVIC	0-5" LS	SM	A-1,A-2	0-5	85-95	80-95	40-60	15-30	--	NP			
LS	5-20" SL 0-2%	SM	A-2,A-4	0-5	85-95	80-95	50-65	25-40	15-25	5-10			
	20-60" SR-L-LFS-GR-COS	SM	A-2,A-4	0-15	75-95	70-90	50-70	25-45	15-25	5-10			

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Column 22 ADDITIONAL PROPERTIES – Enter other soil properties that might be important to engineering.

GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
101	Garlock CB-LCOS 9-15%		>60	>60	B	moderate subsoil	high	low

(Continued on reverse)

101	CLASSIFICATION			COARSE FRACTION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
	USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Garlock 0-6"													
	CB-LCOS	SP-SM	A-1	10-20	80-95	75-90	35-50	5-15	--	NP			
CB-LCOS 6-30"													
	GR-SCL												
	GR-SL	SM	A-2	0-10	70-85	65-80	50-60	20-35	10-20	5-10			
9-15% 30-60"													
	GR-COSL	SM	A-1	0-10	55-80	50-75	35-45	15-25	--	NP			

GENERAL INSTRUCTIONS

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SPECIFIC INSTRUCTIONS

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
120	Garlock Variant CB-LS 5-15%		26-40	>60	C	moderate	high	low
	Dunmovin COS, 5-15%		>60	>60	A	low	moderate	low
	Rock out-crop		0	none	D	none	none	none
121	Garlock variant CB-LS 5-15%		26-40	>60	C	moderate	high	low
	Dunmovin LCOS 5-15%		>60	>60	A	low	moderate	low

(Continued on reverse)

Symbol & Soil Name	USDA TEXT.	UNIFIED	AASHO	COARSE FRACTION (percent) over 13%	PERCENTAGE PASSING SIEVE NUMBER 4	10	40	200	PERCENT LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE DENSITY MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	ADDITIONAL PROPERTIES
120	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Garlock variant CB-LS 5-15%	0-6"CB-LS	GP-GM, SP-SM	A-1	20-35	45-55	40-50	25-35	5-15	--	NP			
	6-32"CL	CL	A-6	0-5	90-95	85-95	75-85	60-70	30-40	15-25			
	32"basalt & cinders	--	--	--	--	--	--	--	--	--			
Dunmovin COS 5-15% rock outcrop	0-60 COS	SP-SM	A-1	0-2	95-100	95-100	40-50	5-15	--	NP			
	basalt	--	--	--	--	--	--	--	--	--			
121													
Garlock variant CB-LS 5-15%	0-6"CO-SL	GP-GM SP-SM	A-1	20-35	45-55	40-50	25-35	3-15	--	NP			
	6-32"CL	CL	A-6	0-5	90-95	85-95	75-85	60-70	30-40	15-25			
	32"+ basalt & cinders	—	—	—	—	—	—	—	—	—			
Dunmovin LCOS 5-15%	0-72" LCOS	SP-SM	A-2	0	95-100	95-100	50-60	5-15	--	NP			

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
220	Gass Variant CB-FSL 5-15%		20-40	>60	C	high	very high	low
	Garlock Variant CB-LS 5-15%		26-40	>60	C	moderate	high	low

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Gass Variant CB-FSL 5-15%												
0-5" CB-FSL	SM	A-4	25-60	90-95	90-95	65-80	35-50	5-15	0-5			
5-23" C	CL, CH	A-7	0-10	85-95	80-95	70-95	60-90	45-55	30-40			
23-40" STV-CL	CL	A-6	50-60	90-95	85-95	75-95	60-75	30-40	20-30			
40" Basalt	-	-	-	-	-	-	-	-	-			
Garlock Variant, CB-LS 5-15%												
0-6" CB-LS	GP-GM, SP-SM	A-1	20-35	45-55	40-50	25-35	5-15	-	NP			
6-32" CL	CL	A-6	0-5	90-95	85-95	75-85	60-70	30-40	15-25			
32" Basalt & Cinders	-	-	-	-	-	-	-	-	-			

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDROLOGIC SOIL GROUP	SHRINK-SWELL POTENTIAL	CORROSIVITY	
			BEDROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CONCRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
170	Haybourne LS 5-15%		>60	>60	B	low	moderate	low

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
170 Haybourne LS 5-15%												
0-9"--LS	SM	A-1,A-2	0	75-95	70-90	35-70	10-30	-	NP			
9-60"--SL	SM	A-1,A-2	0	75-95	70-90	40-60	20-35	-	NP			

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GPO 849-803

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
182	Hooten BY-LFS 5-15%		18-20"	>60	D	low	high	low
183	Hooten LCOS 5-9%		8-20"	>60	D	low	high	low

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
182 Hooten BY-LFS 5-15%												
0-11" BY-LS CB-SL	SM	A-1, A-2	10-50	80-95	75-90	45-60	20-35	-	NP			
11-15" hard-pan	-	-	-	-	-	-	-	-	-			
15-60" GRV-LCOS	GM	A-1	10-40	50-60	45-55	25-40	5-15	-	NP			
183 Hooten LCOS 5-9%												
0-11" LS-CB-SL	SM	A-1, A-2	10-35	80-95	75-90	45-60	20-35	-	NP			
11-15" hard-pan	-	-	-	-	-	-	-	-	-			
15-60" GRV-LCOS	GM	A-1	10-40	50-60	45-55	25-40	5-15	-	NP			

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GPO 849 • 803

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
150	Joshua Variant SL 2-5%		>60	>60	B	moderate	moderate	low
	Arizo BYV-LS 2-5%		>60	>60	A	low	low	low
	Lavic LS 2-5%		>60	>60	B	moderate	very high	low
190	Joshua Variant SL 2-30%		>60		B	moderate	moderate	low
	Nebona Variant CB-LS 2-30%		8-15 hardpan	>60	D	moderate	high	low

(Continued on reverse)

	CLASSIFICATION			COARSE FRAC-TION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDI-TIONAL PROPER-TIES
	USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTI-CITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
150 Joshua, SL shallow sub-stratum, 2-5%													
0-11" SL-SCL	SM		A-2	5-20	85-95	80-95	50-65	25-35	10-20	0-5			
11-60" GRV-LS	GM		A-1	0-5	50-70	45-65	20-50	10-20	-	NP			
Arizo, BYV-LS 2-5%													
0-60" BYV-LCOS	SP-SM		A-2	50-65	95-100	95-100	55-75	5-15	-	NP			
Lavic, LS, 2-5%													
0-5" LS	SM		A-1, A-2	0-5	85-95	80-95	40-60	15-30	-	-			
5-20" SL	SM		A-2, A-4	0-5	85-95	80-95	50-65	25-40	15-25	5-10			
20-60" SR-L-LFS-GRV-COS	SM		A-2, A-4	0-15	75-95	70-90	50-70	25-45	15-25	5-10			
190 Joshua Variant SL, 2-30%													
0-11" SL-SCL	SM		A-2	5-20	85-95	80-95	50-65	25-35	10-20	0-5			
11-60" GRV-LS	GM		A-1	0-5	50-70	45-65	20-50	10-20	-	NP			
Nebona Variant CB-LS, 2-5%													
0-6" CB-LS	SM		A-1, A-2	10-30	65-95	60-90	30-70	10-30	-	NP			
6-8" CL	SC, CL		A-4, A-6	0-5	65-95	60-90	55-85	40-70	25-35	10-20			
8+ indurated hardpan	-		-	-	-	-	-	-	-	-			

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GPO 849-803

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK (inches)	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
107	Lavic LS 0-2%		>60	>60	B	moderate	very high	low
	Dunmovin LCOS 0-2%		>60	>60	A	low	moderate	low
	Playa		>60	intermit-tent ponding	D	not rated	not rated	not rated

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
107												
Lavic, LS, 0-2%												
0-5" LS	SM	A-1, A-2	0-5	85-95	80-95	40-60	15-30	-	-			
5-20" SL	SM	A-2, A-4	0-5	85-95	80-95	50-65	25-40	15-25	5-10			
20-40" SR-L-LFS-GRV-COS	SM	A-2, A-4	5-15	75-95	70-90	50-70	25-45	15-25	5-10			
Dunmovin LCOS 0-2%												
0-72" LCOS	SM	A-2	0	95-100	95-100	50-60	10-20	-	NP			
Playa	Variable not rated	not rated	-	-	-	-	-	-	-			

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
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ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE *(inches)*	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
141	Maynard Lake LCOS 15-30%		60	60	A	low	moderate	low
142	Maynard Lake LCOS 2-15%		60	60	A	low	moderate	low
140	Maynard Lake LCOS 30-50%		60	60	A	low	moderate	low
133	Maynard Lake LCOS 15-30%		60	60	A	low	moderate	low
	COSO ST-SL 15-30%		8-20	none	D	low	high	low

(Continued on reverse)

	CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
141	USDA TEXT. (10)	UNIFIED (11)	AASHO (12)	(percent) (13)	4 (14)	10 (15)	40 (16)	200 (17)	LIQUID LIMIT (LL) (18)	PLASTICITY INDEX (PI) (19)	MAXIMUM DRY DENSITY (lbs./cu.ft.) (20)	OPTIMUM MOISTURE (Percent) (21)	(22)
Maynard Lake LCOS 15-30% 0-72" GR-LS		SM	A-1, A-2	0	60-95	55-90	30-70	10-25	--	NP			
142 Maynard Lake LCOS 2-15%, 0-72" GR-LS		SM	A-1, A-2	0	60-95	55-90	30-70	10-25	--	NP			
140 Maynard Lake LCOS 30-50%, 0-72" GR-LS		SM	A-1, A-2	0	60-95	55-90	30-70	10-25	--	NP			
133 Maynard Lake LCOS 15-30%, 0-72" GR-LS		SM	A-1, A-2	0	60-95	55-90	30-70	10-25	--	NP			
COSO ST-SL 15-30% 0-8" ST-SL 8"+ granite		SM	A2	45-60	75-95	70-90	40-60	20-35	--	NP			

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
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ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDROLOGIC SOIL GROUP	SHRINK-SWELL POTENTIAL	CORROSIVITY	
			BEDROCK (inches)	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CONCRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
180	Nebona Variant 5-30%		8-15 hardpan	>60	D	moderate	high	low
	Alko Variant CB-LS 5-30%		8-20 hardpan	>60	D	high	high	low

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Nebona Variant												
CB-LS, 5-30%												
0-6" CB-LS	SM	A-1, A-2	10-30	65-95	60-90	30-70	10-30	-	NP			
6-8" CL	SC, CL	A-4, A-6	0-5	65-95	60-90	55-85	40-70	25-35	10-20			
8+ indurated hardpan	-	-	-	-	-	-	-	-	-			
Alko Variant												
CB-LS, 5-30%												
0-6" CB-LS	SM	A-1	10-35	90-95	85-95	40-50	15-30	-	NP			
6-18" C_1GrCL GR-SL	SC,CL	A-4, A-6	5-15	70-90	65-85	60-85	45-70	25-35	10-20			
18+ indurated hardpan	-	-	-	-	-	-	-	-	-			

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
232	Rock Outcrop		0	none	D	none	none	none
	Haiwee Variant STV-L 30-50%		10-20" to andesite	none	D	low	high	low

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
232												
Rock Outcrop	-	-	-	-	-	-	-	-	-	-	-	
Haiwee Variant STV-L Cool 30-50%												
0-15" STV-L, ST-L	SM	A-2, A-4	45-65	55-70	50-65	40-60	30-50	20-30	5-15			
15"+ andesite bedrock	-	-	-	-	-	-	-	-	-			

GENERAL INSTRUCTIONS

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SPECIFIC INSTRUCTIONS

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Column 2 SOIL NAME – Enter soil name, slope, and other modifiers. If soil is not correlated, insert the word *"unnamed"*.

Column 22 ADDITIONAL PROPERTIES – Enter other soil properties that might be important to engineering.

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Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK (inches)	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
160	Rubble Land		0	none	D	not rated	-	-
	Torri-orthents 30-75%		20-40	none	D	low	moderate	low
	Rock Outcrop		0	none	D	none	-	-

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
				NUMBER								
USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
160												
Rubble Land												
stones	-	-	-	-	-	-	-	-	-			
Torriorthents												
0-30" STV-SL	SM	A-1, A-2	60-85	85-95	80-90	40-70	10-25	-	NP			
STV-LS												
30" rhyolite	-	-	-	-	-	-	-	-	-			
Rock Outcrop												
bedrock	-	-		-	-	-	-	-	-			

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Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK (inches)	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
234	Shoken ST-SL 30-50% slopes		3-15	none	D	low	high	low
	Rock Outcrop		0	none	D	none	none	none

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
234 Shoken ST-SL 30-50% 0-3" ST-SL	SM	A-1, A-2	45-60	75-95	70-90	40-60	20-35	-	NP			
3+" weathered granite	-	-	-	-	-	-	-	-	-			
Rock Outcrop rock outcrop	-	-	-	-	-	-	-	-	-			

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Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDROLOGIC SOIL GROUP	SHRINK-SWELL POTENTIAL	CORROSIVITY	
			BEDROCK	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CONCRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
221	Sparkhule STV-LFS 5-30%		14 to 20	None	D	moderate	high	low
	Lava flows		0	none	D	none	none	none

(Continued on reverse)

CLASSIFICATION			COARSE FRACTION >3" (percent)	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
USDA TEXT.	UNIFIED	AASHO		4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
221 (10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Sparkhule STV-LFS, 5-30%												
0-6" STV-LFS GR-SL	SM	A-1	40-65	55-75	50-70	30-50	15-30	--	NP			
6-19" GR-CL ST-CL	SC, CL	A-4, A-6	30-50	55-75	50-70	45-70	35-55	25-35	5-15			
19"+ basalt			--									
Lava flows												

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Column 22 ADDITIONAL PROPERTIES – Enter other soil properties that might be important to engineering.

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Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
241	Stumble LCOS 15-30%		60	60	A	low	moderate	low
242	Stumble LCOS 2-15%		60	60	A	low	moderate	
240	Stumble LCOS 30-50%		60	60	A	low	moderate	low
233	Stumble LCOS 15-30%		60	60	A	low	moderate	low
	Shoken ST-SL 15-30%		3-15	none	D	low	high	low

(Continued on reverse)

	CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE NUMBER				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
	USDA TEXT.	UNIFIED	AASHO	(percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
241	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Stumble LCOS 15-30%													
0-60" LCOS	SM	A-1, A-2	0	65-95	60-90	30-70	10-25	--	NP				
242 Stumble LCOS 2-15%													
0-60" LCOS	SM	A-1, A-2	0	65-95	60-90	30-70	10-25	--	NP				
240 Stumble LCOS 2-15%													
0-60" LCOS	SM	A-2, A-2	0	65-95	60-90	30-70	10-24	--	NP				
233 Stumble LCOS 15-30%													
0-60" LCOS	SM	A-1, A-2	0	65-95	60-90	30-70	10-25	--	NP				
Shoken ST-SL 15-30%													
0-3" ST-SL	SM	A-1, A-2	45-60	75-95	70-90	40-60	20-35	--	NP				
3"+ weathered granite													

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GPO 849-503

Table 7-6 (continued)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENGINEERING PROPERTIES OF SOILS
MEASUREMENTS AND INTERPRETATIONS

MAP SYMBOL	SOIL NAME	DEPTH FROM SURFACE OF TYPICAL PROFILE (inches)	DEPTH TO		HYDRO-LOGIC SOIL GROUP	SHRINK-SWELL POTEN-TIAL	CORROSIVITY	
			BED-ROCK inches	SEASONAL HIGH WATER TABLE (inches)			UNCOATED STEEL	CON-CRETE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
135	WASCO variant VFSL 0-2%		>60	>60	B	low	high	low
181	Dunmovin variant LS 2-9%		>60	>60	B	low	moderate	low
	ALKO variant CB-LS 2-9%		8-20 to hardpan	>60	D	high	high	low
	Nebona variant CB-LS 2-9%		8-15 to hardpan	>60	D	moderate	high	low

(Continued on reverse)

135	CLASSIFICATION			COARSE FRACTION	PERCENTAGE PASSING SIEVE				PERCENT		MOISTURE DENSITY		ADDITIONAL PROPERTIES
					NUMBER								
	USDA TEXT.	UNIFIED	AASHO	>3" (percent)	4	10	40	200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MAXIMUM DRY DENSITY (lbs./cu.ft.)	OPTIMUM MOISTURE (Percent)	
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
WASCO VFSL Variant 0-2%	0-5" VFSL	ML	A-4	0	95-100	95-100	80-90	50-60	10-20	5-10			
	5-15" COSL	SM	A-2	0	95-100	95-100	55-65	25-35	--	NP			
	15-51" LCOS weakly cemented	SM	A-2	0	95-100	95-100	50-60	15-25	--	NP			
	51-72" LCOS	SM	A-2	0	95-100	95-100	50-60	15-25	--	NP			
181													
Dunmovin LS variant LS weakly cemented 2-9%	0-36" LS	SP-SM	A-2	0-5	95-100	95-100	50-60	5-15	--	NP			
	36-50" LS												
	50-72" LS												
ALKO CB-LS 2-9%	0-6" CB-LS	SM	A-1	10-35	90-95	85-95	40-50	15-30	--	NP			
	6-18" C,GR-CL GR-SL	SC, CL	A-4, A-6	5-15	70-90	65-85	60-85	45-70	25-35	10-20			
	18" Indurated Hardpan	--	--	--	--	--	--	--	--	--			
Nebona variant CB-LS 2-9%	0-6"=CBLS	SM	A-1,A-2	10-30	65-95	60-90	30-70	10-30	--	NP			
	6-8"=CL	SC, CL	A-4,A-6	0-5	65-95	60-90	55-85	40-70	25-35	10-20			
	8"+ indurated hardpan	--	--	--	--	--	--	--	--	--			

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GPO 849-503

8.0 ORIGIN AND CLASSIFICATION OF SOILS

Soil is a natural body on the surface of the earth in which plants grow. Soils differ from place to place, even within short distances in the same locality.

The factors that cause soils to differ are:

1. The physical and chemical composition of the parent material;
2. The climate under which the soil material has accumulated and existed since accumulation;
3. The biologic plant and animal forces;
4. The relief, or lay of the land; and
5. The length of time the forces of formation have acted on the soil material.

The relative importance of each factor varies from place to place, and it is the interaction of these factors which determines the kind of soil that forms in any given place.

Climate and plants and animals are the active forces in nature gradually converting parent material, a passive factor, into soil. Relief, mostly as it modifies moisture and temperature, influences the rate at which soils form and are lost to erosion processes. The more time that has passed, the more distinct is the character of the soil that forms.

Precipitation is limited, about 5 to 8 inches, in the Coso Area, and temperatures are relatively high. Under these conditions, little moisture is available for plant growth, moisture penetration is limited, and soil formation proceeds slowly. Many of the soil properties observed are those of the parent material itself, and soil changes are confined mostly to the surface foot or two of the soil profile. Vegetation is an open stand of desert shrubs, grasses, and forbs, with scattered Joshua trees in places. Organic matter accumulation is limited (less than one

percent in the surface soil), horizons are thin, more or less lime carbonates is present, and the reaction is dominantly mildly to moderately alkaline. The soils are well to excessively drained, so consequently, salt and alkali accumulation is limited mainly to playas.

Ten soil orders are recognized in the current system. (Soil Taxonomy, Agricultural Handbook 436, U.S. Department of Agriculture, December 1975.) Of these, two orders are in the Coso Area: Entisols and Aridisols. Table 8-1 presents the classification of the soils of the Coso Area. Supporting laboratory data are given in Table 8-2.

ENTISOLS

Entisols are soils that have little or no evidence of horizons due to soil formation. Most of the properties are those of the parent materials. The principal evidence of soil formation is slight changes produced by climate and vegetation.

Six subgroups of Entisols have been recognized in the Coso area. These are:

1. Typic Torriorthents
2. Lithic Xeric Torriorthents
3. Xeric Torriorthents
4. Durorthidic Torriorthents
5. Typic Torripsamments
6. Durorthidic Torripsamments

Typic Torriorthents

Typic Torriorthents represent the central concept of this subgroup. The principal features of the soils are:

1. They are dry in all parts of the moisture control section three-fourths or more of the time that the soil temperature at 50 cm (20 inches) is 5°C (41°F) or higher;

2. The soils are not saturated with water within 1.5 meters (60 inches) of the surface at any time in most years;

3. The soils contain less than 35 percent clay, do not crack to the surface, and have a low to moderate shrink-swell;

4. Do not have a horizon or durinodes within 1 meter (40 inches) of the surface, and

5. Do not have bedrock (lithic contact) within 50 cm (20 inches) of the surface.

There is one named series, Arizo, in this subgroup.

Arizo soils are deep, excessively drained, bouldery sands on recent alluvial fans and narrow drainageways of the Coso Range. The soils are forming on gentle slopes in recent mixed sand and bouldery alluvium from granite and andesite.

The pale colors, lime content, reaction, and other properties of the Arizo soils are largely the properties of the parent materials from which the soils are forming.

Lithic Xeric Torriorthents

Lithic Xeric Torriorthents are like the Typic Torriorthents except they have hard bedrock (lithic contact) within 50 cm (20 inches) of the surface. There are two series, Haiwee and Haiwee Variant, in this subgroup.

Haiwee soils are shallow, somewhat excessively drained, very stony sandy loam soils. The soils overlie hard fractured granite and some basic rocks at 8 to 20 inches depth on steep slopes. Haiwee Variant soils are high elevation, shallow, somewhat excessively drained, very stony loams. They overlie hand fractured andesite at 10 to 20 inches depth, have a mesic temperature regime. The color and other properties of the Haiwee and Haiwee Variant soils are largely the properties of the parent materials from which they are forming.

Xeric Torriorthents

Soils in this subgroup depart from the Typic Torriorthents in that they are moist in some part of the moisture control section more than one-fourth of the time while the soil temperature at a depth of 50 cm is 5°C (41°F) or higher. They are in areas of winter precipitation and have an aridic moisture regime that approaches xeric.

The Coso, Coso Variant, and Shoken soils are in this subgroup. Coso soils are shallow to very shallow, somewhat excessively drained, stony sandy loams that overlie highly weathered and fractured granite at a depth of 8 to 20 inches. Some roots are in the soil in the rock fractures to 40 inches. Coso Variant soils are deep, well-drained soils forming on colluvial toeslopes of granitic uplands. They consist of very stony, sandy loam and loams on moderately steep to steep slopes of the Coso Range. Shoken soils are shallow to very shallow, somewhat excessively drained higher elevation soils similar in properties to the Coso soils, except they possess a mesic temperature regime.

Durorthidic Torriorthents

The one soil in this subgroup, Wasco Variant, has weak cementation with silica within 1 meter (40 inches) of the surface. The Wasco Variant soil is a deep, well-drained soil on alluvial fans and valley fill

material, with a weakly cemented horizon at a depth of 15 to 20 inches. Slopes are nearly level. The weak silica cementation in the substratum is probably due to the weathering of primary silicate minerals.

Typic Torripsamments

Typic Torripsamments represent the central concept for this subgroup. They are sands which are otherwise similar to the soils in the Typic Torriorthent subgroup.

There are three series in this subgroup: Maynard Lake, Dunmovin, and Stumble.

Maynard Lake soils are deep and very deep, somewhat excessively drained loamy coarse sands. The soils are forming on gentle to steep slopes on recent alluvial fans from the Sierra Nevada and Coso Range. The soils are forming in recent alluvium mainly from rhyolitic tuff with some andesitic tuff and pyroclastics.

Dunmovin soils are very deep, somewhat excessively drained, loamy coarse sands. The soils are forming on very gently to strongly sloping recent alluvial fans. The alluvium is mixed, but dominantly from granitic sources.

Stumble soils are deep, somewhat excessively higher elevation drained soils similar in all respects to Maynard Lake soils, except that their soil temperature regime is mesic.

The pale color, lime content, reaction, and other properties of the Maynard Lake, Dunmovin, and Stumble soils are largely the properties of the parent materials from which they are forming.

Durorthidic Xeric Torripsamments

Durrorthidic Xeric Torripsamments are like the Typic Torripsamments except:

1. They contain a horizon of durinodes or are weakly cemented within one meter (40 inches) of the surface, and
2. They are moist longer than three months of the time soil temperature is above 5°C (41°F).

There is one series, Dunmovin Variant, in this subgroup.

Dunmovin Variant soils are deep, somewhat excessively drained soils on slightly older alluvial fans from the Coso Range. The soils are forming in mixed alluvium but dominantly from granitic rocks. The soil has a weakly silica-cemented subsoil at a depth of 35 to 40 inches. The weak silica cementation in the substratum is probably due to weathering of primary silicate minerals. The parent materials are slightly older, and sufficient time has passed to allow for the weakly silica-cemented horizon to form.

ARIDISOLS

Aridisols are soils that have very limited moisture supplies for long periods of time (less than 3 months when the soil is warm). Temperature regimes vary from very cold to very warm, but moisture regimes are mostly aridic. Vegetation is sparse, and much of the surface is barren of plant cover.

Nine subgroups are recognized in the Aridisol order. These are:

1. Typic Calciorthids
2. Xerollic Camborthids
3. Typic Haplargids
4. Lithic Haplargids

5. Typic Natrargids
6. Duric Haplargids
7. Typic Durorthids
8. Typic Nadurargids
9. Entic Durorthids

Typic Calciorthids

Typic Calciorthids represent the central concept for this subgroup. These soils have a calcic horizon and:

1. Show no evidence of ground water within one meter (40 inches) of the surface,
2. Do not have appreciable cementation by silica,
3. Have little organic matter or available moisture,
4. Do not have shallow bedrock, and
5. Do not have intrusion of a former clayey (argillic) horizon by a calcic horizon.

One series, Lavic, is in this subgroup.

Lavic soils are deep, well-drained soils with variable stratification. The soil is on lower alluvial fans, including the valley floor and interplaya flats in Rose Valley. The soil profile is stratified with A and B2t horizons overlying a strongly effervescent Cca horizon. In some profiles, deposition may account for the lime in the calcic horizon. Where the lime enrichment is due to soil formation, time is probably the principal explanation for the enrichment in the substrata. Additional moisture from runoff from higher lying areas probably also accounts for some of the leaching and concentration of lime in the calcic horizon.

Xerollic Camborthids

Xerollic Camborthids are similar to the Typic Camborthids except that they have a cambic horizon. Cambic horizons have a reddish or brownish

color, presumably due to the release of iron in the subsoil mainly in place. Xerollic Camborthids have a mean annual soil temperature lower than 22°C (72°F) and a mean summer and mean winter soil temperature at a depth of 50 cm (20 inches) that differs by 5°C or more. They also have an aridic moisture regime that borders on a xeric regime. One series, Haybourne, is in this subgroup.

Haybourne soils are deep and very deep, well-drained soils. They are forming in mixed alluvium and colluvium from rhyolitic tuff and granite. The soils are on moderately to strongly sloping slopes in valleys and swales in the uplands of the Coso Range. The Cambic subsoil horizon is presumably due to the release of iron in place. These are somewhat older sediments, and there has been sufficient time for this weathering and release of iron from the primary minerals. The soil is also mildly alkaline to neutral and noncalcareous throughout the profile. These properties may also reflect leaching of a somewhat older soil. The soil occurs at elevations above 4800 feet. Here the rainfall is slightly higher and the soil temperatures slightly lower. Plant growth is somewhat greater, reflecting the greater supply of moisture. The increased vegetation is probably the reason for the 3-inch grayish-brown surface soil. The color reflects more organic matter and explains the Xerollic Camborthid intergrade.

Typic Haplargids

Typic Haplargids represent the central concept of this subgroup. These soils have an argillic horizon and:

1. Show no evidence of current ground water within a depth of one meter (40 inches),
2. Do not have appreciable cementation by silica,
3. Have little organic matter and available moisture,
4. Little evidence of soil movement, and

5. No hard rock (lithic contact) within 50 cm (20 inches) of the surface.

There are two series, Garlock and Garlock Variant, in this subgroup.

Garlock soils are deep, well-drained soils. They occur on old, strongly dissected stream terraces and alluvial fans from the Sierra Nevada. The soils formed in old gravelly and cobbly mixed alluvium dominantly from granitic sources. The soil has a distinct enrichment of clay in the subsoil (B2t) along with reddish-brown color due to iron minerals.

The Garlock Variant soil is a moderately deep, well-drained soil. It formed basalt flows and cinders overlain by wind-blown sand deposits. Depth to a lithic contact is 26 to 40 inches. The subsoil (B2t) is a heavy clay loam.

Time to form such distinct argillic horizons is the most probable explanation for the Garlock and Garlock Variant soils.

Typic Natrargids

Typic Natrargids represent the central concept of this subgroup. These soils have an argillic horizon and:

1. Have a natric horizon
2. Do not have a petrocalcic horizon whose upper boundary is within 1 meter of the soil surface
3. Do not have a duripan whose upper boundary is within 1 meter of the soil surface.

One soil, Gass Variant, falls into this subgroup. Gass Variant soils are moderately deep, well-drained, fine-textured soils forming on basalt. This soil has a strongly developed argillic (B2t) horizon, and has 15 percent or more of the exchange complex saturated with sodium throughout the

major part of the natric horizon. The high sodium content of this soil is probably inherited from the parent material, and the well-developed argillic horizon in this soil reflects a considerable period of weathering.

Duric Haplargids

Duric Haplargids are like the Typic Haplargids, but they have a horizon within one meter (40 inches) of the surface that shows some silica cementation but does not meet the requirements of a duripan. There is one series, Joshua variant, in this subgroup.

Joshua variant soils are deep, well-drained soils on older alluvial fans. The soils formed in older alluvium mostly from granitic sources. The upper substratum (C1si) below the subsoil (B2t) is discontinuously hardened by silica at a depth of 10 to 20 inches. This weak silica cementation reflects some accumulation of silica in the substratum. Long continued chemical weathering possibly explains this process of silica accumulation.

Typic Durorthids

Typic Durorthids represent the central concept of this subgroup. The soils have a strongly developed duripan and have:

1. No evidence of current ground water,
2. Little organic carbon and available moisture, and
3. Only a moderate contrast between the argillic horizon and the overlying horizon.

There is one series, Nebona Variant, in this subgroup. Nebona Variant soils are very shallow to shallow, well-drained soils overlying an indurated silica-cemented hardpan at 8 to 15 inches depth. The soil is on old dissected high alluvial fans. The soil is forming in old mixed alluvium from acid and basic igneous rocks. Considerable time is needed for a thick indurated duripan to form.

Typic Nadurargids

The Typic Nadurargids represent the central concept of the subgroup. Nadurargids are soils with argillic horizons that have a natric horizon above a duripan and the upper boundary of the duripan is within 1 meter of the soil surface. One series, Alko Variant, is in this subgroup.

Alko Variant soils are shallow, well-drained soils with a clay subsoil overlying an indurated silica-cemented hardpan at 8 to 20 inches depth. The soil has 15 percent or more of the exchange complex in the subsoil saturated with sodium. The soil formed in old mixed alluvium from acid and basic igneous rocks. The soil occurs in close association with the Nebona Variant soil, and both soils appear to be very old. Erosion or small differences in micro-relief may explain the presence of an argillic horizon in the Alko Variant soil and its absence in the Nebona Variant soil.

Lithic Haplargids

These soils have a lithic contact within 50 cm (20 inches) of the surface but otherwise are like Typic Haplargids. The Sparkhule series falls into this subgroup. Sparkhule soils are shallow, well-drained soils on basaltic uplands and cinder cones. They have a well-developed argillic horizon and have a lithic contact at a depth of 14 to 20 inches.

Entic Durorthids

There is one series, the Hooten Variant, in this subgroup. Hooten Variant soils are shallow, well-drained soils overlying a discontinuous, strongly silica-cemented hardpan, with finely inter-stratified cobbly sandy loam within 20 miles of the surface. The Hooten Variant is forming on old, strongly dissected alluvial fan. The duripan in the Hooten Variant soil is discontinuous, thinner, and less strongly developed than in the Nebona Variant soil. Presumably the Nebona Variant soil has been weathering for a longer time than the Hooten Variant soil.

TABLE 8-1. COSO AREA SOIL SURVEY CLASSIFICATION TABLE

ARIDISOLS

Argids

Typic Haplargids

Fine-loamy, mixed, thermic

Garlock

Fine, montmorillonitic, thermic

Garlock Variant

Duric Haplargids

Fine-loamy, mixed, thermic

Joshua Variant

Lithic Haplargids

Loamy-skeletal, mixed, thermic

Sparkhule

Typic Nadurargids

Clayey, montmorillonitic, thermic, shallow

Alko Variant

Typic Natrargids

Fine, montmorillonitic, thermic

Gass Variant

Orthids

Typic Calciorthids

Coarse-loamy, mixed, thermic

Lavic

Xerollic Camborthids

Coarse-loamy, mixed, mesic

Haybourne (Tax.)

Typic Durorthids

Sandy, mixed, thermic, shallow

Nebona Variant

Entic Durorthids

Loamy-skeletal, mixed, thermic, shallow

Hooten Variant

TABLE 8-1. COSO AREA SOIL SURVEY CLASSIFICATION TABLE (Concluded)

ENTISOLS

Orthents

Typic Torriorthents

Sandy-skeletal, mixed, thermic

Arizo (Tax.)

Durorthidic Torriorthents

Coarse-loamy, mixed, thermic

Wasco Variant

Lithic Xeric Torriorthents

Loamy-skeletal, mixed, nonacid, mesic

Haiwee Variant

Loamy-skeletal, mixed, nonacid, thermic

Haiwee

Xeric Torriorthents

Loamy-skeletal, mixed, nonacid, mesic, shallow

Shoken

Loamy-skeletal, mixed, nonacid, thermic, shallow

Coso

Loamy-skeletal, mixed, nonacid, thermic

Coso Variant

Psamments

Typic Torripsamments

Mixed, mesic

Stumble (Tax.)

Mixed, thermic

Maynard Lake

Mixed, thermic

Dunmovin

Durorthidic Torripsamments

Mixed, thermic

Dunmovin Variant

9.0 REFERENCES CITED

1. Chesterman, C.W., 1956, Pumice, Pumicite, and Volcanic Cinders in California: California Division of Mines Bulletin 174, p. 62-67.

2. Dale, R.F., 1966, Climates of the States; California, Climatography of the United States No. 60-4, 46p.

3. Duffield, W.A., and Smith, G.I., 1978a, Pleistocene History of Volcanism and the Owens River Near Little Lake, California, Journal Research U.S. Geological Survey Vol. 6, No. 3, p. 395-408.

4. Duffield, W.A., and Smith, G.I., 1978b, Pleistocene River Erosion and Intracanyon Lava Flows Near Little Lake, Inyo County, California, California Geology Vol. 31, No. 4, p. 81-89.

5. Duffield, W.A., and Bacon, C.R., 19-7, Preliminary Geologic Map of the Coso Volcanic Field and Adjacent Areas, Inyo County, California, U.S. Geological Survey, Open File map 77-311.

6. Fenneman, N.M., 1931, Physiography of Western United States, McGraw-Hill Book Company, Inc., New York.

7. Hall, W.E., and MacKevett, E.M. Jr., 1962, Geology and Ore Deposits of the Darwin Quadrangle; Inyo County, California: v.s. Geological Survey Prof. Paper 368, 87 p.

8. Hulen, J.B., 1978, Geology and Alteration of the Coso Geothermal Area, Inyo County, California, University of Utah Earth Science Laboratory, Contract No. EG-78-C-07-1701.

9. Meteorology Section, Range Support Branch Range Instrumentation Support Division, and Range Department, January 1977, U.S. Naval Weapons Center Climatological Summaries for 1946 through 1976, Code 6234.

10. Soil Survey Investigations Procedure Handbook, U.S. Department of Agriculture, Soil Conservation Service, August 1978.

11. Stinson, M.C., 1977, Geology of the Haiwee Reservoir 15' Quadrangle, Inyo County, California, California Division of Mines and Geology, Map Sheet 37.

12. USDA Soil Conservation Service, 1975, Soil Taxonomy, Agricultural Handbook No. 436.

13. USDA Soil Conservation Service, 1951, Soil Survey Manual, Agriculatural Handbook No. 18.

14. USDA Soil Conservation Service, 1974, National Soils Handbook.

15. U.S. Department of Commerce, 1976, Climatological Data Annual Summary: California, Vol. 80, No. 13.

16. USDA, Soil Conservation Service, August 1978, Soil Series of the United States.

10.0 GLOSSARY

ABC SOIL - A soil with a distinctly developed profile, including A, B, and C horizons.

AC SOIL - A soil having a profile containing only A and C horizons with no clearly developed B horizon.

ACID SOIL - A soil with a preponderance of hydrogen ions, and probably of aluminum, in proportion to hydroxyl ions. Specifically, soil with a pH value of less than 7.0. For most practical purposes, a soil with a pH value of less than 6.6. The pH values obtained vary greatly with the method used and, consequently, there is no unanimous agreement as to what constitutes an acid soil. (The term is usually applied to the surface layer or to the root zone unless specified otherwise.)

ADSORPTION COMPLEX - The group of substances in soil capable of adsorbing other materials. Organic and inorganic colloidal substances form the greater part of the adsorption complex; the noncolloidal materials, such as silt and sand, exhibit adsorption but to a much lesser extent than the colloidal materials.

AERATION, SOIL - The process by which air in the soil is replaced by air from the atmosphere. In a well-aerated soil, the soil air is very similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than the atmosphere above the soil. The rate of aeration depends largely on the volume and continuity of pores within the soil.

AEROBIC - (i) Having molecular oxygen as a part of the environment. (ii) Growing only in the presence of molecular oxygen as aerobic organisms. (iii) Occurring only in the presence of molecular oxygen (said of certain chemical or biochemical processes such as aerobic decomposition).

AGRONOMY - A specialization of agriculture concerned with the theory and practice of field-crop production and soil management. The scientific management of land.

AIR-DRY - (i) The state of dryness (of a soil) at equilibrium with the moisture content in the surrounding atmosphere. The actual moisture content will depend upon the relative humidity and the temperature of the surrounding atmosphere. (ii) To allow to reach equilibrium in moisture content with the surrounding atmosphere.

AIR PORISITY - The proportion of the bulk volume of soil that is filled with air at any given time or under a given condition such as a specified moisture tension. Usually the large pores; that is, those drained by a tension of less than approximately 100 cm of water. See moisture tension.

ALKALI SOIL - (i) A soil with a high degree of alkalinity (pH of 8.5 or higher) or with a high exchangeable sodium content (15% or more of the exchange capacity), or both. (ii) A soil that contains sufficient alkali (sodium) to interfere with the growth of most crop plants. See saline-alkali soil and sodic soil.

ALKALINE SOIL - Any soil that has a ph greater than 7.0. See reaction, soil.

ALKALIZATION - The process whereby the exchangeable sodium content of a soil is increased.

AMENDMENT, SOIL - (i) An alteration of the properties of a soil, and thereby of the soil, by the addition of substances such as lime, gypsum, sawdust, etc., to the soil for the purpose of making the soil more suitable for the production of plants. (ii) Any such substance used for this purpose. Strictly speaking, fertilizers constitute a special group of soil amendments.

AMMONIFICATION - The biochemical process whereby ammoniacal nitrogen is released from nitrogen-containing organic compounds.

AMMONIUM FIXATION - The adsorption or obsorption of ammonium ions by the mineral or organic fractions of the soil in a manner that they are relatively insoluble in water and relatively unexchangeable by the usual methods of cation exchange.

ANAEROBIC - (i) The absence of molecular oxygen. (ii) Growing in the absence of molecular oxygen (such as anaerobic bacteria). (iii) Occurring in the absence of molecular oxygen (as a biochemical process).

ANION-EXCHANGE CAPACITY - The sum total of exchangeable anions that a soil can adsorb. Expressed as milliequivalents per 100 grams of soil (or of other adsorbing material such as clay).

ANGULAR COBBLY - See coarse fragments and cobbly.

APPARENT DENSITY (Obsolete) - A term formerly used to designate the mass of dry soil (105 C) per unit volume. See bulk density, soil.

APPARENT SPECIFIC GRAVITY (Obsolite) - A term formerly used to designate the ratio of the mass per unit bulk volume of soil and water. See bulk specific gravity.

AVAILABLE NUTRIENT - That portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants. ("Available" should not be confused with "exchangeable.")

AVAILABLE WATER - The portion of water in a soil that can be readily absorbed by plant roots. Considered by most workers to be that water held in the soil against a pressure of up to approximately 15 bars. See field capacity and moisture tension.

B

BADLAND - A land type generally devoid of vegetation and broken by an intricate maze of narrow ravines, sharp crests, and pinnacles resulting from serious erosion of soft geologic materials. Most common in arid or semiarid regions. A miscellaneous land type.

BAR - A unit of pressure equal to one million dynes per square centimeter.

BASE-SATURATION PERCENTAGE - The extent to which the adsorption complex of a soil is saturated with exchangeable cations other than hydrogen. It is expressed as a percentage of the total cation-exchange capacity.

BC SOIL - A soil profile with B and C horizons but with little or no A horizon.

BEDROCK - The solid rock underlying soils and the regolith in depths ranging from zero (where exposed by erosion) to several hundred feet.

BIOLOGICAL INTERCHANGE - The interchange of elements between organic and inorganic states in a soil or other substrate through the agency of biological activity. It results from biological decomposition of organic compounds and the liberation of inorganic materials (mineralization); and, from the utilization of inorganic materials in the synthesis of microbial tissue (immobilization). Both processes commonly proceed continuously in soils.

BIOLOGICAL MINERALIZATION - See mineralization and biological interchange.

BIOSEQUENCE - A sequence of related soils that differ, one from the other, primarily because of differences in kinds and numbers of soil organisms as a soil-forming factor.

BLOWN-OUT LAND - Areas from which all or almost all of the soil and soil material has been removed by wind erosion. Usually barren, shallow depressions with a flat or irregular floor consisting of a more resistant layer and/or an accumulation of pebbles, or a wet zone immediately above a water table. Usually unfit for crop production. A miscellaneous land type.

BLOWOUT - A small area of blown-out land.

BRECCIA - A rock composed of coarse angular fragments cemented together.

BUFFER COMPOUNDS, SOIL - The clay, organic matter, and compounds such as carbonates and phosphates which enable the soil to resist appreciable change in pH.

BULK DENSITY, SOIL - The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105 C.

BULK SPECIFIC GRAVITY - The ratio of the bulk density of a soil to the mass of unit volume of water.

BULK VOLUME - The volume, including the solids and the pores, of an arbitrary soil mass.

BURIED SOIL - Soil covered by an alluvial, silty, or other deposit, usually to a depth greater than the thickness of the solum.

C

CALCAREOUS SOIL - Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold 0.1N hydrochloric acid.

CALICHE - (i) A layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft thin soil horizon, as a hard thick bed just beneath the solum, or as a surface layer exposed by erosion (see croute calcaire). Not a geologic deposit. (ii) Alluvium cemented with sodium nitrate, chloride and/or other soluble salts in the nitrate deposits of Chile and Peru.

CAPILLARY FRINGE - A zone just above the water table (zero gauge pressure) that remains almost saturated. (The extent and the degree of definition of the capillary fringe depends upon the size-distribution of pores).

CARBON CYCLE - The sequence of transformations whereby carbon dioxide is fixed in living organisms by photosynthesis or by chemosynthesis, liberated by respiration and by the death and decomposition of the fixing organism, used by heterotrophic species, and ultimately returned to its original state.

CARBON-NITROGEN RATIO - The ratio of the weight of organic carbon to the weight of total nitrogen in a soil or in organic material. It is obtained by dividing the percentage of organic carbon (C) by the percentage of total nitrogen (N).

CATEGORY - Any one of the ranks of the system of soil classification in which soils are grouped on the basis of their characteristics.

CATENA - A sequence of soils of about the same age, derived from similar parent material, and occurring under similar climatic conditions, but having different characteristics due to variation in relief and in drainage. See clinosequence and toposequence.

CATION EXCHANGE - The interchange between a cation in solution and another cation on the surface of any surface-active material such as clay colloid or organic colloid.

CATION-EXCHANGE CAPACITY - The sum total of exchangeable cations that a soil can adsorb. Sometimes called "total-exchange capacity," "base-exchange capacity," or "cation-adsorption capacity." Expressed in milliequivalents per 100 grams of soil (or of other adsorbing material such as clay).

CEMENTED - Indurated; having a hard, brittle consistency because the particles are held together by cementing substances such as humus, calcium carbonate, or the oxides of silicon, iron, and aluminum. The hardness and brittleness persist even when wet.

CHANNERY - In Scotland and Ireland, gravel; in the United States, thin, flat fragments of limestone, sandstone, or schist up to 6 inches in major diameter. See coarse fragments.

CHROMA - The relative purity, strength, or saturation of a color; directly related to the dominance of the determining wavelength of the light and inversely related to grayness; one of the three variables of color. See Munsell color system, hue, and value, color.

CHRONOSEQUENCE - A sequence of related soils that differ, one from the other, in certain properties primarily as a result of time as a soil-forming factor.

CLASS, SOIL - A group of soils having a definite range in a particular property such as acidity, degree of slope, texture, structure, land-use capability, degree of erosion, or drainage. See soil texture and soil structure.

CLASSIFICATION, SOIL - The systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

CLAY - (i) A soil separate consisting of particles less than 0.002 mm in equivalent diameter. See soil separates. (ii) A textural class. See soil texture.

CLAYEY - Containing large amountsof clay or having properties similar to those of clay.

CLAY LOAM - A textural class. See soil texture.

CLAY MINERAL - (i) Naturally occurring inorganic crystalline material found in soils and other earthy deposits, the particles being of clay size, that is, less than 0.002 mm in diameter. (ii) Material as described under (i), but not limited by particle size.

CLAYPAN - A dense, compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by downward movement of clay or by synthesis of clay in place during soil formation. Claypans are usually hard when dry, and plastic and sticky when wet. Also, they usually impede the movement of water and air, and the growth of plant roots.

CLIMATIC INDEX - A simple, single numerical value that expresses climatic relationships; for example, the numerical value obtained in Transeau's precipitation-evaporation ratio.

CLIMAX - A plant community of the most advanced type capable of development under, and in dynamic equilibrium with, the prevailing environment.

CLIMOSEQUENCE - A sequence of related soils that differ, one from the other, in certain properties primarily as a result of the effect of climate as a soil-forming factor.

CLINOSEQUENCE - A group of related soils that differ, one from the other, in certain properties primarily as a result of the effect of the degree of slope on which they were formed. See toposequence.

CLOD - A compact, coherent mass of soil ranging in size from 5 or 10 mm to as much as 8 or 10 inches; produced artificially, usually by the activity of man by plowing, digging, etc., especially when these operations are performed on soils that are either too wet or too dry for normal tillage operations.

COARSE FRAGMENTS - Rock or mineral particles more than 2.0 mm in diameter.

COARSE TEXTURE - The texture exhibited by sands, loamy sands, and sandy loams except very fine sandy loam. A soil containing large quantities of these textural classes (United States usage). See sand, sandy, and moderately coarse texture.

COBBLESTONE - Rounded or partially rounded rock or mineral fragments between 3 and 10 inches in diameter. See coarse fragments.

COBBLY - Containing appreciable quantities of cobblestones. (Said of soil and of land. The term "angular cobbly" is used when the fragments are less rounded.) See coarse fragments.

COLLUVIUM - A deposit of rock fragments and soil material accumulated at the base of steep slopes as a result of gravitational action. See creep.

CONCENTRATED FLOW - The flowing of a rather large accumulated body of water over a relatively narrow course. It often causes serious erosion and gullying.

CONCRETION - A local concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of a grain or nodule of varying size, shape, hardness, and color.

CONSISTENCY - (i) the resistance of a material to deformation or rupture. (ii) The degree of cohesion or adhesion of the soil mass. Terms used for describing consistency at various soil moisture contents are:

WET SOIL - nonsticky, slightly sticky, sticky, very sticky, nonplastic, slightly plastic, plastic, and very plastic.

MOIST SOIL - Loose, very friable, friable, firm, very firm, and extremely firm.

DRY SOIL - Loose, soft, slightly hard, hard, very hard, and extremely hard.

CEMENTATION - Weakly cemented, strongly cemented, and indurated.

COPPICE MOUND - A small mound of stabilized soil material around desert shrubs. (A microrelief term.)

CREEP - Slow mass movement of soil and soil material down relatively steep slopes primarily under the influence of gravity, but facilitated by saturation with water and by alternate freezing and thawing.

CROTOVINA - A former animal burrow in one soil horizon that has been filled with organic matter or material from another horizon (also spelled "krotovina".)

CROUTE CALCAIRE - Hardened caliche, often found in thick masses or beds overlain by only a few inches of earth. See caliche.

CRUMB - A soft, porous, more or less rounded ped from 1 to 5 mm in diameter. See soil structure types and soil structure classes.

CRUMB STRUCTURE - A structural condition in which most of the peds are crumbs.

CRUST - A surface layer on soils, ranging in thickness from a few millimeters to perhaps as much as an inch, that is much more compact, hard, and brittle, when dry, than the material immediately beneath it.

CRYSTALLINE ROCK - A rock consisting of various minerals that have crystallized in place from magma. See igneous rock and sedimentary rock.

CULTIVATION - A tillage operation used in preparing land for seeding or transplanting or later for weed control and for loosening the soil.

CYCLIC SALT - Salt deposited on the soil by wind blowing off the sea or off inland salt lakes.

D

DARCY'S LAW - A law describing the rate of flow of water through porous media. (Named for Henry Darcy of Paris who formulated it in 1856 from extensive work on the flow of water through sand filter beds.)

DECALCIFICATION - The removal of calcium carbonate or calcium ions from the soil by leaching.

DEFLATION - The removal of fine soil particles from soil by wind.

DEPOSIT - Material left in a new position by a natural transporting agent such as water, wind, ice, or gravity, or by the activity of man.

DESERT CRUST - A hard layer, containing calcium carbonate, gypsum, or other binding material, exposed at the surface in desert regions.

DESERT PAVEMENT - The layer of gravel or stones left on the land surface in desert regions after the removal of the fine material by wind erosion.

DESERT VARNISH - A glossy sheen or coating on stones and gravel in arid regions.

DISPERSE - (i) To break up compound particles such as aggregates, into the individual component particles. (ii) To distribute or suspend fine particles, such as clay, in or throughout a dispersion medium, such as water.

DISPERSION MEDIUM - The portion of a colloidal system in which the disperse phase is distributed.

DIVERSION DAM - A structure or barrier built to divert part or all of the water of a stream to a different course.

DRAG - The force retarding the flow of water or wind over the surface of the ground.

DRAIN, TO - (i) To provide channels such as open ditches or drain tile so that excess water can be removed by surface or by internal flow. (ii) To lose water (from the soil) by percolation.

DRAINAGE, EXCESSIVE - Too much or too rapid loss of water from soils, either by percolation or by surface flow. Loss greater than that necessary to prevent the development of an anaerobic condition for any appreciable length of time.

DRY AGGREGATE - A compound or secondary soil particle that is not destroyed by dry sieving.

DRYLAND FARMING - The practice of crop production in low-rainfall areas without irrigation.

DRY-WEIGHT PERCENTAGE - The ratio of the weight of any const ituent (of a soil) to the oven-dry weight of the soil. See oven-dry soil.

DUST MULCH - A loose, finely granular, or powdery condition on the surface of the soil, usually produced by shallow cultivation.

DYNAMOMETER - An instrument for measuring draft of tillage implements and for measuring resistance of soil to penetration by tillage implements.

E

ECOLOGY - The science that deals with the interrelations of organisms and their environment.

EDAPHIC - (i) Of or pertaining to the soil. (ii) Resulting from or influenced by factors inherent in the soil or other substrate, rather than by climatic factors.

EDAPHOLOGY - The science that deals with the influence of soils on living things, particularly plants, including man's use of land for plant growth.

EFFECTIVE PRECIPITATION - That portion of the total precipitation which becomes available for plant growth.

ELUVIAL HORIZON - A soil horizon that has been formed by the process of eluviation. See illuvial horizon.

ELUVIATION - The removal of soil material in suspension (or in solution) from a layer or layers of a soil. (Usually, the loss of material in solution is described by the term "leaching." See illuviation and leaching.

EQUIVALENT DIAMETER - In sedimentation analysis, the diameter assigned to a nonspherical particle, it being numerically equal to the diameter of a spherical particle of the same density and velocity of fall.

ERODE - To wear away or remove the land surface by wind, water, or other agents.

ERODIBLE - Susceptible to erosion. (Expressed in terms such as highly erodible, slightly erodible, etc.)

EROSION - (i) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. (ii) Detachment and movement of soil or rock by water, wind, ice, or gravity.

EROSION CLASSES - A goruping of erosion conditions based on the degree of erosion or on characteristic patterns. (Applied to accelerated erosion; not to normal, natural, or geological erosion.) Four erosion classes are recognized for water erosion and three for wind erosion. Specific definitions for each vary somewhat from one climatic zone, or major soil group, to another. (For details see Soil Survey Staff, SCS, USDA, 1951. Soil survey manual. U.S. Dept. Agr. Handbook 18. U.S. Government Printing Office, Washington.)

EROSION PAVEMENT - A layer of coarse fragments, such as sand or gravel, remaining on the surface of the ground after the removal of fine particles by erosion.

EVAPOTRANSPIRATION - The combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and by transpiration from plants.

EXCHANGE CAPACITY - The total ionic charge of the adsorption complex active in the adsorption of ions. See anion-exchange capacity and cation-exchange capacity.

EXCHANGEABLE-CATION PERCENTAGE - The extent to which the adsorption complex of a soil is occupied by a particular cation. It is expressed as follows:

$$ECP = \frac{\text{Exchangeable cation (meq/100 g soil)}}{\text{Cation-exchange capacity (meq/100 g soil)}} \times 100.$$

EXCHANGEABLE POTASSIUM - The potassium that is held by the adsorption complex of the soil and is easily exchanged with the cation of neutral non-potassium salt solutions.

EXCHANGEABLE-SODIUM PERCENTAGE - The extent to which the adsorption complex of a soil is occupied by sodium. It is expressed as follows:

$$ESP = \frac{\text{Exchangeable sodium (meq/100 g soil)}}{\text{Cation-exchange capacity (meq/100 g soil)}} \times 100.$$

F

FAMILY, SOIL - In soil classification, one of the categories intermediate between the great soil group and the soil series. See classification, soil.

FERTILITY, SOIL - The status of a soil with respect to the amount and availability to plants of elements necessary for plant growth.

FERTILIZER - Any organic or inorganic material of natural or synthetic origin which is added to a soil to supply certain elements essential to the growth of plants.

FERTILIZER GRADE - The guaranteed minimum analysis, in percent, of the major plant nutrient elements contained in a fertilizer material or in a mixed fertilizer. (Usually refers to the percentage of $N.P_2O_5.K_2O$ but proposals are pending to change the designation to the percentage of N.P.K.)

FERTILIZER REQUIREMENT - The quantity of certain plant nutrient elements needed, in addition to the amount supplied by the soil, to increase plant growth to a designated optimum.

FIELD CAPACITY (FIELD MOISTURE CAPACITY) - (Obsolete in technical work.) The percentage of water remaining in a soil 2 or 3 days after having been saturated and after free drainage has practically ceased. (The percentage may be expressed on the basis of weight or volume.) See moisture tension.

FILM WATER - A layer of water surrounding soil particles and varying in thickness from 1 or 2 to perhaps 100 or more molecular layers. Usually considered as that water remaining after drainage has occurred, because it is not distinguishable in saturated soils.

FINE SAND - (i) A soil separate. See soil separates. (ii) A soil textural class. See soil texture.

FINE TEXTURE - Consisting of or containing large quantities of the fine fractions, particularly of silt and clay. (Includes all clay loams and clays; that is, clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay textural classes. Sometimes subdivided into clayey texture and moderately fine texture.) See soil texture.

FIRM - A term describing the consistency of a moist soil that offers distinctly noticeable resistance to crushing but can be crushed with moderate pressure between the thumb and forefinger. See consistency.

FIRST BOTTOM - The normal flood plain of a stream.

FIXATION - The process or processes in a soil by which certain chemical elements essential for plant growth are converted from a soluble or exchangeable form to a much less soluble or to a nonexchangeable form; for example, phosphate "fixation." Contrast with nitrogen fixation.

FLAGSTONE - A relatively thin fragment, 6 to 15 inches long, of sandstone, limestone, slate, shale or, rarely, of schist. See coarse fragments.

FLOOD PLAIN - The land bordering a stream, built up of sediments from overflow of the stream and subject to inundation when the stream is at flood stage. See first bottom.

FOLIAR DIAGNOSIS - An estimation of the extent to which plants are getting certain necessary chemical elements from the soil by examination of the color and growth habits of the foliage of the plants.

FRIABLE - A consistency term pertaining to the ease of crumbling of soils. See consistency.

G

G HORIZON - (Obsolete as a major horizon; now used to modify a major horizon, as Bg.) A layer of intense reduction, with ferrous iron and gray to brown mottlings. See soil horizon.

GENETIC - Resulting from, or produced by, soil-forming processes; for example, a genetic soil profile or a genetic horizon.

GRANULE - A natural soil aggregate or ped which is relatively nonporous. See soil structure and soil structure types.

GRAVELLY - Containing appreciable or significant amounts of gravel. (Used to describe soils or lands.) See coarse fragments.

GRAVITATIONAL WATER - Water which moves into, through, or out of the soil under the influence of gravity.

GREAT SOIL GROUP - One of the categories in the system of soil classification that has been used in the United States for many years. See classification, soil.

GREEN MANURE - Plant material incorporated with the soil while green, or soon after maturity, for improving the soil.

GREEN-MANURE CROP - A crop grown for use as green manure.

GROUNDWATER - That portion of the total precipitation which at any particular time is either passing through or standing in the soil and the underlying strata and is free to move under the influence of gravity. See water table.

GULLY - A channel resulting from erosion and caused by the concentrated but intermittent flow of water usually during and immediately following heavy rains. Deep enough to interfere with, and not to be obliterated by, normal tillage operations.

H

HALOPHYTIC VEGETATION - Salt-loving or salt-tolerant vegetation, usually having fleshy leaves or thorns and resembling desert vegetation.

HARDPAN - A hardened soil layer, in the horizon, caused by cementation of soil particles with organic matter or with materials such as silica, sesquioxides, or calcium carbonate. The hardness does not change appreciably with changes in moisture content and pieces of the hard layer do not slake in water. See caliche and claypan.

HEAVY SOIL - (Obsolete in scientific use.) A soil with a high content of the fine separates, particularly clay, or one with a high drawbar pull and hence difficult to cultivate. See fine texture.

HUE - One of the three variables of color. It is caused by light of certain wavelengt hs and changes with the wavelength. See Munsell color system, chroma, and value, color.

HUMIFICATION - The processes involved in the decomposition of organic matter and leading to the formation of humus.

HUMUS - That more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues have decomposed. Usually it is dark colored.

HYDROLOGIC CYCLE - The fate of water from the time of precipitation until the water has been returned to the atmosphere by evaporation and is again ready to be precipitated.

HYDROUS MICA - A silicate clay with 2:1 lattice structure, but of indefinite chemical composition since usually part of the silicon in the silica tetrahedral layer has been replaced by aluminum, and containing a considerable amount of potassium which serves as an additional bonding between the crystal units, resulting in particles larger than normal in montmorilloaite and, consequently, in a lower cation-exchange capacity. Sometimes referred to as illite. See clay mineral.

HYGROSCOPIC WATER - Water adsorbed by a dry soil from an atmosphere of high relative humidity, water remaining in the soil after "air-drying," or water held by the soil when it is in equilibrium with an atmosphere of a specified relative humidity at a specified temperature, usually 98% relative humidity at 25 C.

I

IGNEOUS ROCK - Rock formed from the cooling and solidification of magma, and that has not been changed appreciably since its formation.

ILLUVIAL HORIZON - A soil layer or horizon in which material carried from an overlaying layer has been precipitated from solution or deposited from suspension. The layer of accumulation. See eluvial horizon.

ILLUVIATION - The process of deposition of soil material removed from one horizon to another in the soil; usually from an upper to a lower horizon in the soil profile. See eluviation.

IMMATURE SOIL - A soil with indistinct or only slightly developed horizons because of the relatively short time it has been subjected to the various soil-forming processes. A soil that has not reached equilibrium with its environment.

IMPEDED DRAINAGE - A condition which hinders the movement of water through soils under the influence of gravity.

IMPERVIOUS - Resistant to penetration by fluids or by roots.

INDICATOR PLANTS - Plants characteristic of specific soil or site conditions.

INFILTRATION - The downward entry of water into the soil.

INFILTRATION RATE - A soil characteristic determining or describing the maximum rate at which water can enter the soil under specified conditions, including the presence of an excess of water. It has the dimensions of velocity (i.e., $cm^3\ cm^{-2}\ sec^{-1} = cm\ sec^{-1}$) (Formerly, the infiltration capacity.)

INTERGRADE - A soil that possesses moderately well-developed distinguishing characteristics of two or more genetically related great soil groups.

IONS - Atoms, groups of atoms, or compounds, which are electrically charged as a result of the loss of electrons (cations)or the gain of electrons (anions).

ION ACTIVITY - The effective concentration of a particular ion in a solution or soil-water system. It is expressed analogously to pH, as "pCa," "pNa," etc.

IRON-PAN - An indurated soil horizon in which iron oxide is the principal cementing agent.

IRRIGATION - The artificial application of water to the soil for the benefit of growing crops.

IRRIGATION EFFICIENCY - The ratio of the water actually consumed by crops on an irrigated area to the amount of water diverted from the source onto the area.

IRRIGATION METHODS - The manner in which water is artificially applied to an area.

K

KAOLIN - (i) An aluminosilicate mineral of the 1:1 crystal lattice group; that is, consisting of one silicon tetrahedral layer and one aluminum oxide-hydroxide actahedral layer. (ii) The 1:1 group or family of aluminosilicates.

L

LACUSTRINE DEPOSIT - Material deposited in lake water and later exposed either by lowering of the water level or by the elevation of the land.

LACUSTRINE SOIL - (Obsolete) Soil formed on or from lacustrine deposits.

LAND CLASSIFICATION - The arrangement of land units into various categories based upon the properties of the land or its suitability for some particular purpose.

LANDSCAPE - All the natural features such as fields, hills, forests, water, etc., which distinguish one part of the earth's surface from another part. Usually that portion of land or territory which the eye can comprehend in a single view, including all its natural characteristics.

LANDSLIDE - (i) A mass of material which has slipped down hill under the influence of gravity, frequently assisted by water (that is, when the material is saturated). (ii) Rapid movement down slope of a mass of soil, rock, or debris.

LAND, WILD - Uncultivated land; it may or may not be maintained by the owner for its productive vegetative cover or for wood, forage production, recreation, or wildlife.

LATTICE - A three-dimensional grid of lines connecting the points representing the centers of atoms or ions in a crystal.

LEACHED SALINE SOILS - (i) Soils from which the soluble salts have been removed by leaching. (ii) Soils that have been saline and still possess the major physical characteristics of saline soils but from which the soluble salts have been leached, generally for reclamation.

LEACHING - The removal of materials in solution from the soil. See eluviation.

LIGHT SOIL - (Obsolete in scientific use) A coarse-textured soil; a soil with a low drawbar pull and hence easy to cultivate. See coarse texture and soil texture.

LIME, AGRICULTURAL - A soil amendment consisting principally of calcium carbonate but including magnesium carbonate and perhaps other materials, andused to furnish calcium and magnesium as essential elements for the growth of plants and to neutralize soil acidity.

LIME CONCRETION - An aggregate of precipitated calcium carbonate, or of other material cemented by precipitated calcium carbonate.

LIME-PAN - A hardened layer cemented by calcium carbonate.

LIQUID LIMIT - The minimum percentage (by wieght) of moisture at which a small sample of soil will barely flow under a standard treatment. Synonymous with "upper plastic limit."

LITHOSEQUENCE - A group of related soils that differ, one from the other, in certain properties primarily as a result of differences in the parent rock as a soil-forming factor.

LOAM - A soil textural class. See soil texture.

LOAMY - Intermediate in texture and properties between fine-textured and coarse-textured soils. Includes all textural classes with the words "loam" or "loamy" as a part of the class name, such as clay loam or loamy sand. See loam and soil texture.

LOESS - Material transported and deposited by wind and consisting of predominantly silt-sized particles.

LOOSE - A soil consistency term. See consistency.

LYSIMETER - (i) A device for measuring percolation and leaching losses from a column of soil under controlled conditions. (ii) A device for measuring gains (precipitation and condensation) and losses (evapotranspiration) by a column of soil.

M

MACRONUTRIENT - A chemical element necessary in large amounts (usually more than 1 ppm in the plant) for the growth of plants and usually applied artificially in fertilizer or liming materials ("macro" refers to quantity and not to the essentiality of the element). See micronutrient.

MADE LAND - Areas filled with earth, or with earth and trash mixed, usually by or under the control of man. A miscellaneous land type.

MANURE - (i) The excreta of animals, with or without the admixture of bedding or litter, in varying stages of decomposition. Also referred to as "Barnyard manure" or "stable manure." (The usual meaning of the term as used in the USA; in many other countries, "manure" refers to any fertilizer.)

MARL - Soft and unconsolidated calcium carbonate, usually mixed with varying amounts of clay or other impurities.

MARSH - Periodically wet or continually flooded areas with the surface not deeply submerged. Covered dominantly with sedges, cattails, rushes, or other hydrophytic plants. Subclasses include fresh-water and salt-water marshes. See swamp.

MATURE SOIL - A soil with well-developed soil horizons produced by the natural processes of soil formation and essentially in equilibrium with its present environment.

MECHANICAL ANALYSIS - (Obsolete) See particle-size analysis and particle-size distribution.

MEDIUM-TEXTURE - Intermediate between fine-textured and coarse-textured (soils). (It includes the following textural classes: very fine sandy loam, loam, silt loam, and silt.)

MELLOW SOIL - A very soft, very friable, porous soil without any tendency toward hardness or harshness. See consistency.

MATAMORPHIC ROCK - Rock derived from pre-existing rocks but that differ from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth. The pre-existing rocks may have been igneous, sedimentary, or another form of metamorphic rock.

MICROCLIMATE - (i) The climatic condition of a small area resulting from the modification of the general climatic conditions by local differences in elevation or exposure. (ii) The sequence of atmospheric changes within a very small region.

MICROFAUNA - That part of the animal population which consists of individuals too small to be clearly distinguished without the use of a microscope. Includes protozoa and nematodes.

MICROFLORA - That part of the plant population which consists of individuals too small to be clearly distinguished without the use of a microscope. Includes actinomycetes, algae, bacteria, and fungi.

MICRONUTRIENT - A chemical element necessary in only extremely small amounts (less than 1 ppm in the plant) for the growth of plants. Examples are: B, Cl, Cu, Fe, Mn, and Zn. ("micro" refers to the amount used rather than to its essentiality.) See macronutrient.

MICRORELIEF - Small-scale, local differences in topography, including mounds, swales, or pits that are only a few feet in diameter and with elevation differences of up to 6 feet. See coppice mound.

MINE DUMPS - Areas covered with overburden and other waste materials from ore and coal mines, quarries, and smelters, and usually with little or no vegetative cover. A miscellaneous land type.

MINE WASH - Water-deposited accumulations of sandy, silty, or clayey material recently eroded in mining operations. It may clog streams and channels, and damage land on which it is deposited. A miscellaneous land type.

MINERALIZATION - The conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

MINERALOGICAL ANALYSIS - The estimation or determination of the kinds or amounts of minerals present in a rock or in a soil.

MINERAL SOIL - A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. Usually contains less than 20% organic matter, but may contain an organic surface layer up to 30 cm thick.

MISCELLANEOUS LAND TYPE - A mapping unit for areas of land that have little or no natural soil, that are too nearly inaccessible for orderly examination, or that for any reason it is not feasible to classify the soil. See badland, made land, mine dumps, mine wash, river wash, rough broken land, rubble land, scoria land, slickens, stony land, swamp, urban land, volcanic-ash land, and waste land.

MODERATELY-COARSE TEXTURE - Consisting predominantly of coarse particles. (In soil textural classification, it includes all the sandy loams except the very fine sandy loam.) See coarse texture.

MODERATELY-FINE TEXTURE - Consisting predominantly of intermediate-size (soil) particles or with relatively small amounts of fine or coarse particles. (In soil textural classifications, it includes clay loam, sandy clay loam, and silty clay loam.) See fine texture.

MOISTURE EQUIVALENT - The weight percentage of water retained by a previously saturated sample of soil 1 cm in thickness after it has been subjected to a centrifugal force of one thousand times gravity for 30 min.

MOISTURE-RETENTION CURVE - A graph showing the soil moisture percentage (by weight or by volume) versus applied tension (or pressure). Points on the graph are usually obtained by increasing (or decreasing) the applied tension or pressure over a specified range.

MOISTURE TENSION (OR PRESSURE) - The equivalent negative pressure in the soil water. It is equal to the equivalent pressure that must be applied to the soil water to bring it to hydraulic equilibrium, through a porous permeable wall or membrane, with a pool of water of the same composition. See soil water.

MOISTURE VOLUME PERCENTAGE - The ratio of the volume of water in a soil to the total bulk volume of the soil.

MOISTURE WEIGHT PERCENTAGE - The moisture content expressed as a percentage of the oven-dry weight of soil. See dry-weight percentage.

MONTMORILLONITE - An aluminosilicate clay mineral with a 2:1 expanding crystal structure that is, with two silicon tetrahedral layers enclosing an aluminum octahedral layer. Considerable expansion may be caused along the C axis by water moving between silica layers of contiguous units. See montmorillonite-saponite group.

MONTMORILLONITE-SAPONITE GROUP - Clay minerals with 2:1 crystal lattice structure; that is, two silicon tetrahedral layers enclosing an aluminum octahedral layer. Consists of montmorillonite, beidellite, nontronite, saponite, and others.

MOTTLED ZONE - A layer that is marked with spots or blotches of different color or shades of color. The pattern of mottling and the size, abundance, and color contrast of the mottles may vary considerably and should be specified in soil description.

MOTTLING - Spots or blotches of different color or shades of color interspersed with the dominant color.

MULCH - (i) Any material such as straw, sawdust, leaves, plastic film, loose soil, etc., that is spread upon the surface of the soil to protect the soil and plant roots from the effects of raindrops, soil crusting, freezing, evaporation, etc. (ii) To apply mulch to the soil surface.

MUNSELL COLOR SYSTEM - A color designation system that specifies the relative degrees of the three simple variables of color: hue, value, and chroma. For example: 10YR 6/4 is a color (of soil) with a hue = 10YR, value = 6, and chroma = 4. These notations can be translated into several different systems of color names as desired. See chroma, hue, and value, color.

N

NEUTRAL SOIL - A soil in which the surface layer, at least to normal plow depth, is neither acid nor alkaline in reaction. See acid soil, alkaline soil, pH, and reaction, soil.

NITRIFICATION - The biochemical oxidation of ammonium to nitrate.

NITROGEN CYCLE - The sequence of biochemical changes undergone by nitrogen wherein it is used by a living organism, liberated upon the death and decomposition of the organism, and converted to its original state of oxidation.

O

ORGANIC PHOSPHORUS - Phosphorus present as a constituent of an organic compound, or a group of organic compounds such as glycerophosphoric acid, inositol phosphoric acid, cytidylic acid, etc.

ORGANIC SOIL - A soil which contains a high percentage (more than 15 or 20%) or oganic matter throughout the solum.

OVEN-DRY SOIL - Soil which has been dried at 105 C until it reaches constant weight.

P

PANS - Horizons or layers, in soils, that are strongly compacted, indurated, or very high in clay content. See caliche, claypan, and hardpan.

PAN, GENETIC - A natural subsurface soil layer of low or very low permeability, with a high concentration of small particles, and differing in certain physical and chemical properties from the soil immediately above or below the pan. See claypan and hardpan, both of which are genetic pans.

PAN, PRESSURE OR INDUCED - A subsurface horizon or soil layer having a higher bulk density and a lower total porosity than the soil directly above or below it, as a result of pressure that has been applied by normal tillage operations or by other artificial means. Frequently referred to as plowpan, plowsole, or traffic pan.

PARENT MATERIAL - The unconsolidated and more or less chemically weathered mineral, or organic matter from which the solum of soils is developed by pedogenic processes.

PARTICLE DENSITY - The mass per unit volume of the soil particles. In technical work, usually expressed as grams per cubic centimeter. See bulk density, soil.

PARTICLE SIZE - The effective diameter of a particle measured by sedimentation, sieving, or micrometric methods.

PARTICLE-SIZE ANALYSIS - Determination of the various amounts of the different separates in a soil sample, usually by sedimentation, sieving, micrometry, or combinations of these methods.

PARTICLE-SIZE DISTRIBUTION - The amounts of the various soil separates in a soil sample, usually expressed as weight percentages.

PARTS PER MILLION (PPM) - Weight units of any given substance per one million equivalent weight units of oven-dry soil; or, in the case of soil solution or other solution, the weight units of solute per million weight units of solution.

PED - A unit of soil structure such as an aggregate, crumb, prism, block, or granule, formed by natural processes (in contrast with a clod, which is formed artificially).

PENEPLAIN - A once high, rugged area which has been reduced by erosion to a low, gently rolling surface resembling a plain.

PENETRABILITY - The ease with which a probe can be pushed into the soil. (May be expressed in units of distance, speed, force, or work depending on the type of penetrometer used.)

PERCOLATION, SOIL WATER - The downward movement of water through soil. Especially, the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

PERMEABILITY, SOIL - (i) The ease with which gases, liquids, or plant roots penetrate or pass through a bulk mass of soil or a layer of soil. Since different soil horizons vary in permeability, the particular horizon under question should be designated. (ii) The property of a porous medium itself that relates to the ease with which gases, liquids, or other substances can pass through it. Previously, frequently considered the "k" in Darcy's law. The "K" in intrinsic permeability. See intrinsic permeability, Darcy's law, and soil water.

pH, SOIL - The negative logarithm of the hydrogen-ion activity of a soil. The degree of acidity (or alkalinity) of a soil as determined by means of a glass, quinhydrone, or other suitable electrode or indicator at a specified moisture content or soil-water ratio, and expressed in terms of the pH scale.

PHASE, SOIL - A subdivision of a soil type or other unit of classification having characteristics that affect the use and management of the soil but which do not vary sufficiently to differentiate it as a separate type. A variation in a property or characteristic such as degree of slope, degree of erosion, content of stones, etc.

PHOTOMAP - A mosaic map made from aerial photographs with physical and cultural features shown as on a planimetric map. See planisaic and toposaic.

PHYSICAL PROPERTIES (OF SOILS) - Those characteristics, processes, or reactions of a soil which are caused by physical forces and which can be described by or expressed in physical terms or equations. Sometimes confused with and difficult to separate from chemical properties; hence, the terms "physical-chemical" or "physiocochemical." Examples of physical properties are bulk density, water-holding capacity, hydraulic conductivity, porosity, pore-size distribution, etc.

PHYSICAL WEATHERING - The breakdown of rock and mineral particles into smaller particles by physical forces such as frost action. See weathering.

PLASTIC SOIL - A soil capable of being molded or deformed continuously and permanently, by relatively moderate pressure, into various shapes. See consistency.

PLASTIC LIMIT - The minimum moisture percentage by weight at which a small sample of soil material can be deformed without rupture. Synonymous with "lower plastic limit." See liquid limit and plasticity number.

PLASTICITY NUMBER - The numerical difference between the liquid and the plastic limit or, synonymously, between the lower plastic limit and the upper plastic limit. Sometimes called "plasticity index."

PLASTICITY RANGE - The range of moisture weight percentage within which a small sample of soil exhibits plastic properties.

PLARY - Consisting of soil aggregates that are developed predominately along the horizontal axes; laminated; flaky. See soil structure types.

PORE-SIZE DISTRIBUTION - The volume of the various sizes of pores in a soil. Expressed as percentages of the bulk volume (soil plus pore space).

PORE SPACE - Total space not occupied by soil particles in a bulk volume of soil.

POROSITY - The volume percentage of the total bulk not occupied by solid particles.

POTASSIUM FIXATION - The process of converting exchangeable or water-soluble potassium to moderately soluble potassium, i.e., to a form not easily exchanged from the adsorption complex with a cation of a neutral salt solution.

POTASSIUM-SUPPLYING POWER OF SOILS - The capacity of the soil to supply potassium to growing plants from both the exchangeable and the moderately available forms.

PRECIPITATION INTERCEPTION - The stopping, interrupting and temporary holding of precipitation in any form by a vegetative canopy or vegetation residue.

PRIMARY MINERAL - A mineral that has not been altered chemically since deposition and crystallization from molten lava. See secondary mineral.

PRISMATIC SOIL STRUCTURE - A soil structure type with prismlike aggregates that have a vertical axis much longer than the horizontal axes. See soil structure types.

PRODUCTIVE SOIL - A soil in which the chemical, physical, and biological conditions are favorable for the economic production of crops suited to a particular area.

PROFILE, SOIL - A vertical section of the soil through all its horizons and extending into the parent material.

R

REACTION, SOIL - The degree of acidity or alkalinity of a soil, usually expressed as 1 pH value. Descriptive terms commonly associated with certain ranges in pH are: extremely acid - less than 4.5; very strongly acid - 4.5-5.0; strongly acid, 5.1-5.5; medium acid, 5.6-6.0; slightly acid, 6.1-6.5; neutral, 6.6-7.3; mildly alkaline, 7.4-7.8; moderately alkaline, 7.9-8.4; strongly alkaline, 8.5-9.0; and very strongly alkaline, more than 9.1.

REGOLITH - The unconsolidated mantle of weathered rock and soil material on the earth's surface; loose earth materials above solid rock. (Approximately equivalent to the term "soil" as used by many engineers.)

RESIDUAL MATERIAL - Unconsolidated and partly weathered mineral material accumulated by disintegration of consolidated rock in place.

RESIDUAL SOIL - (Obsolete). A soil formed from, or resting on, consolidated rock of the same kind as that from which it was formed, and in the same location. See residual material.

REVERSION - The changing of essential plant nutrient elements from soluble to less soluble forms as a result of interaction with, or reactions in, the soil. Usually restricted to the conversion of monocalcium phosphate to the less soluble dicalcium phosphate.

RHIZOSPHERE - That portion of the soil directly affected by plant roots.

RIVER WASH - Barren alluvial land, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water. A miscellaneous land type.

ROCK LAND - Areas containing frequent rock outcrops and shallow soils. Rock outcrops usually occupy from 50 to 90% of the area. A miscellaneous land type.

ROUGH BROKEN LAND - Land with very steep topography and numerous intermittent drainage channels but usually covered with vegetation. See miscellaneous land type and badlands.

RUBBLE LAND - Land areas with 90% or more of the surface covered with stones and boulders. A miscellaneous land type.

RUNOFF - That portion of the precipitation on an area which is discharged from the area through stream channels. That which is lost without entering the soil is called surface runoff and that which enters the soil before reaching the stream is called groundwater runoff or seepage flow from groundwater. (In soil science, "runoff" usually refers to the water lost by surface flow; in geology and hydraulics "runoff" usually includes both surface and subsurface flow.)

S

SALINE-ALKALI SOIL - (i) A soil containing sufficient exchangeable sodium to interfere with the growth of most crop plants and containing appreciable quantities of soluble salts. The exchangeable sodium percentage is more than 15, the conductivity of the saturation extract more than 4 millimhos per centimeter (at 25 C), and the pH is usually 8.5 or less in the saturated soil. (ii) A saline-alkali soil has a combination of harmful quantities of salts and either a high alkalinity or high content of exchangeable sodium, or both, so distributed in the profile that the growth of most crop plants is reduced. (Often called saline-sodic soil.)

SALINE SOIL - A nonalkali soil containing sufficient soluble salts to impair its productivity. (This name was formerly applied to any soil containing sufficient soluble salts to interfere with plant growth.)

SALINIZATION - The process of accumulation of salts in soil.

SALT-AFFECTED SOIL - Soil that has been adversely modified for growth of most crop plants by the presence of certain types of exchangeable ions or of soluble salts. (Includes soil having an excess of salts, or an excess of exchangeable sodium, or both.) See saline-alkali soil, saline soil, and sodic soil.

SAND - (i) A soil particle between 0.05 and 2.0 mm in diameter. (ii) Any one of five soil separates, namely: very coarse sand, coarse sand, medium sand, fine sand, and very fine sand. See soil separates. (iii) A soil textural class. See soil texture.

SANDY - Containing a large amount of sand. (Applied to any one of the soil classes that contains a large percentage of sand.) See class, soil and soil texture.

SANDY CLAY LOAM - A soil textural class. See class, soil, and soil texture.

SANDY CLAY - A soil textural class. See class, soil, and soil texture.

SANDY LOAM - A soil textural class. See class, soil, and soil texture.

SATURATE - (i) To fill all the voids between soil particles with a liquid. (ii) To form the most concentrated solution possible under a given set of physical conditions in the presence of an excess of the solute. (iii) To fill to capacity, as the adsorption complex with a cation species, e.g., H-saturated, etc.

SECOND BOTTOM - The first terrace above the normal flood plain of a stream.

SECONDARY MINERAL - A mineral resulting from the decomposition of a primary mineral or from the reprecipitation of the products of decomposition of a primary mineral. See primary mineral.

SEDIMENTARY ROCK - A rock formed from materials deposited from suspension or precipitated from solution and usually being more or less consolidated. The principal sedimentary rocks are sandstones, shales, limestones, and conglomerates.

SHALY - (i) Containing a large amount of shale fragments, as a soil. (ii) A soil phase as, for example, shaly phase. See coarse fragments.

SHEAR - Force, as of a tillage implement, acting at right angles to the direction of movement.

SILT - (i) A soil separate consisting of particles between 0.05 and 0.002 mm in equivalent diameter. See soil separates. (ii) A soil textural class. See soil texture.

SILTING - The deposition of water-borne sediments in stream channels, lakes, reservoirs, or on flood plains, usually resulting from a decrease in the velocity of the water.

SILT LOAM - A soil textural class containing a large amount of silt and small quantities of sand and clay. See soil texture and class, soil.

SILTY CLAY - A soil textural class containing a relatively large amount of silt and clay and a small amount of sand. See soil texture and class, soil.

SILTY CLAY LOAM - A soil textural class containing a relatively large amount of silt, a lesser quantity of clay, and a still smaller quantity of sand. See class, soil, and soil texture.

SINGLE-GRAIN STRUCTURE - (Obsolete) A soil structure classification in which the soil particles occur almost completely as individual or primary particles with essentially no secondary particles or aggregates being present. (Usually found only in extremely coarse-textured soil.)

SITE - (i) In ecology, an area described or defined by its biotic, climatic, and soil conditions as related to its capacity to produce vegetation. (ii) An area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular climax vegetation.

SLATY - Containing a considerable quantity of slate fragments. (Used to modify soil texture class names as, "slaty clay loam," etc.) See coarse fragments.

SLICKENS - Fine-textured materials separated in placer mining and in ore-mill operations; may be detrimental to plant growth unless confined in specially constructed basins. A miscellaneous land type.

SLICK SPOTS - Small areas in a field that are slick when wet, due to a high content of alkali or of exchangeable sodium.

SODIC SOIL - (i) A soil that contains sufficient sodium to interfere with the growth of most crop plants. (ii) A soil in which the exchangeable-sodium percentage is 15 or more.

SOIL AIR - The soil atmosphere; the gaseous phase of the soil, being that volume not occupied by solid or liquid.

SOIL ALKALINITY - The degree or intensity of alkalinity of a soil, expressed by a value more than 7.0 on the pH scale.

SOIL ASSOCIATION - (i) A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic region, comparable to plant associations in many ways. (Sometimes called "natural land type.") (ii) A mapping unit used on general soil maps, in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because the scale of the map or the purpose for which it is being made does not require delineation of the individual soils.

SOIL AUGER - A tool for boring into the soil and withdrawing a small sample for field or laboratory observation. Soil augers may be classified into several types as follows: (i) those with worm-type bits, uninclosed; (ii) those with worm-type bits inclosed in a hollow cylinder; and (iii) those with a hollow cylinder with a cutting edge at the lower end.

SOIL CHEMISTRY - A division of soil science concerned with the chemical constitution, the chemical properties, and the chemical reactions of soils.

SOIL COMPLEX - A mapping unit used in detailed soil surveys where two or more defined taxonomic units are so intimately intermingled geographically that it is undesirable or impractical, because of the scale being used. to separate them. A more intimate mingling of smaller areas of individual taxonomic units than that described under soil association.

SOIL CONSERVATION - (i) Protection of the soil against physical loss by erosion or against chemical deterioration; that is, excessive loss of fertility by either natural or artificial means. (ii) A combination of all management and land use methods which safeguard the soil against depletion or deterioration by natural or by man-induced factors. (iii) A division of soil science concerned with soil conservation (i) and (ii).

SOIL EXTRACT - The solution separated from a soil suspension or from a soil by filtration, centrifugation, suction, or pressure. (May or may not be heated prior to separation.)

SOIL-FORMATION FACTORS - The variable, usually interrelated natural agencies that are active in and responsible for the formation of soil. The factors are usually grouped into five major categories as follows: parent rock, climate, organisms, topography, and time.

SOIL GENESIS - (i) The mode of origin of the soil with special reference to the processes or soil-forming factors responsible for the development of the solum, or true soil, from the unconsolidated parent material. (ii) A division of soil science concerned with soil genesis (i).

SOIL GEOGRAPHY - A subspecialization of physical geography concerned with the areal distributions of soil types.

SOIL HORIZON - A layer of soil or soil material approximately parallel to the land surface and differing from adjacent generically related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistency, kinds and numbers of organisms present, degree of acidity or alkalinity, etc.

SOIL IMPROVEMENT - The processes for, or the results of, making the soil more productive for growing plants, by drainage, irrigation, addition of fertilizers and soil amendments, and the like.

SOIL MANAGEMENT - (i) The sum total of all tillage operations, cropping practices, fertilizer, lime, and other treatments conducted on or applied to a soil for the production of plants. (ii) A division of soil science concerned with the items listed under (i).

SOIL MANAGEMENT GROUPS - Groups of taxonomic soil units with similar adaptations or management requirements for one or more specific purposes, such as: adapted crops or crop rotations, drainage practices, fertilization, forestry, highway engineering, etc.

SOIL MAP - A map showing the distribution of soil types or other soil mapping units in relation to the prominent physical and cultural features of the earth's surface.

SOIL MECHANICS AND ENGINEERING - A subspecialization of soil science concerned with the effect of forces on the soil and the application of engineering principles to problems involving the soil.

SOIL MICROBIOLOGY - A subspecialization of soil science concerned with soil-inhibiting microorganisms and with their relation to agriculture, including both plant and animal growth.

SOIL MINERAL - (i) Any mineral that occurs as a part of or in the soil. (ii) A natural inorganic compound with definite physical, chemical, and crystalline properties (within the limits of isomorphism), that occurs in the soil. See clay mineral.

SOIL MINERALOGY - A subspecialization of soil science concerned with the homogeneous inorganic materials found in the earth's crust to the depth of weathering or of sedimentation.

SOIL MOISTURE - Water contained in the soil.

SOIL MONOLITH - A vertical section of a soil profile removed from the soil and mounted for display or study.

SOIL MORPHOLOGY - (i) The physical constitution, particularly the structural properties, of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile, and by the texture, structure, consistency, and porosity of each horizon. (ii) The structural characteristics of the soil or any of its parts.

SOIL ORGANIC MATTER - The organic fraction of the soil; includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. Usually determined on soils which have been sieved through a 2.0-mm sieve.

SOIL PIPING OR TUNNELING - Acclerated erosion which results in subterranean voids and tunnels.

SOIL POPULATION - All the organisms living in the soil, including plants and animals.

SOIL PORES - That part of the bulk volume of soil not occupied by soil particles; interstices; voids.

SOIL PROVINCE - (Obsolete) Areas similar in mode of origin of the soil parent materials or in geological or geographic features.

SOIL SALINITY - The amount of soluble salts in a soil, expressed in terms of percentage, parts per million, or other convenient ratios.

SOIL SCIENCE - That science dealing with soils as a natural resource on the surface of the earth including soil formation, classification and mapping and the physical, chemical, biological, and fertility properties of soils per se; and these properties in relation to their management for crop production.

SOIL SEPARATES - The separates recognized by the International Society of Soil Science are: (I) coarse sand, 2.0 to 0.2 mm; (II) fine sand, 0.2 to 0.02 mm; (III) silt, 0.02 to 0.002 mm; and (IV) clay, less than 0.002 mm.

SOIL SERIES - The basic unit of soil classification being a subdivision of a family and consisting of soils which are essentially alike in all major profile characteristics except the texture of the A horizon.

SOIL SOLUTION - The aqueous liquid phase of the soil and its solutes consisting of ions dissociated from the surfaces of the soil particles and of other soluble materials.

SOIL STRUCTURE - The combination or arrangement of primary soil particles into secondary particles, units, or peds. These secondary units may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades, respectively. See soil structure classes, soil structure grades, and soil structure types.

SOIL STRUCTURE CLASSES - A grouping of soil structural units or peds on the basis of size. See soil structure, soil structure types.

SOIL STRUCTURE GRADES - A grouping or classification of soil structure on the basis of inter- and intra-aggregate adhesion, cohesion, or stability within the profile.

SOIL STRUCTURE TYPES - A classification of soil structure based on the shape of the aggregates or peds and their arrangement in the profile. See soil structure, soil structure classes, soil structure grades.

SOIL SURVEY - The systematic examination, description, classification, and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of field examination.

SOIL TEXTURE - The relative proportions of the various soil separates in a soil as described by the classes of soil texture. The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts; for example, "stony silt loam," or "silt loam, stony phase." (For other modifications see coarse fragments.) The sand, loamy sand, and sandy loam are further subdivided on the basis of the proportions of the various sand separates present.

SOIL TYPE - (i) The lowest unit in the natural system of soil classification; a subdivision of a soil series and consisting of or describing soils that are alike in all characteristics including the texture of the A horizon. (ii) In Europe, roughly equivalent to a great soil group.

SOIL VARIANT - A soil whose properties are believed to be sufficiently different from other known soils to justify a new series name but comprising such a limited geographic area that creation of a new series is not justified.

SOIL WATER

(a) Terms Relating to the State of Water in Soil: Water in soil is subject to several force fields originating from the presence of the soil solid phase, the dissolved salts, the action of external gas pressure, and the gravitational field. These effects may be quantitatively expressed by assigning an individual component potential to each. The sum of these potentials is designated the total potential of soil water and may be identified with the partial specific Gibb's free energy of the soil water relative to free pure water at the same temperature. It should be noted that soil water is understood to be the equilibrium solution in the soil; pure water refers to the chemically pure compound H_2O.

(b) Terms Relating to the Movement of Water in Soil: Experimentally, it has been established that generally the flow of a fluid in a porous medium can be described by Darcy's law which states that the flux of fluid is proportional to the driving force. In viscous flow of water in soils, the driving force equals the negative gradient of the hydraulic potential.

SOLUBLE-SODIUM PERCENTAGE (SSP) - The proportion of sodium ions in solution in relation to the total cation concentration, defined as follows:

$$SSP = \frac{\text{Soluble-sodium concentration (meq/liter)}}{\text{Total cation concentration (meq/liter)}} \times 100.$$

SOLUM (PLURAL: SOLA) - The upper and most weathered part of the soil profile; the A and B horizons.

SPOIL BANK - Rock waste, banks, and dumps, from the escavation of ditches.

STICKY POINT - (i) A condition of consistency at which the soil barely fails to stick to a foreign object. (ii) Specifically and numerically, the weight moisture percentage of a well-mixed, kneaded soil that barely fails to adhere to a polished nickel or stainless steel surface when the shearing speed is 5 cm/sec.

STOKES LAW - An equation relating the terminal settling velocity of a smooth, rigid sphere in a viscous fluid of known density and viscosity to the diameter of the sphere when subjected to a known force field. Used in particle-size analysis of soils by the pipette, hydrometer, or centrifuge methods.

STONES - Rock fragments more than 10 inches in diameter if rounded, and more than 15 inches along the greater axis if flat. See coarse fragments.

STONINESS - The relative proportion of stones in or on the soil. Used in classification of soils. See coarse fragments.

STONY - Containing sufficient stones to interfere with or to prevent tillage. To be classified as stony, more than 0.01% of the surface of the soil must be covered with stones. Used to modify soil class, as stony clay loam or clay loam, stony phase. See coarse fragments.

STONY LAND - Areas containing sufficient stones to make the use of machinery impractical; usually 15 to 90% of the surface is covered with stones. A miscellaneous land type. See stoniness and rubble land.

STRATIFIED - Arranged in or composed of strata or layers.

SUMMATION CURVE, PARTICLE SIZE - A curve showing the accumulative percentage by weight of particles within increasing (or decreasing) size limits as a function of diameter; the percent by weight of each size fraction is plotted accumulatively on the ordinate as a function of the total range of diameters represented in the sample plotted on the abscissa.

SURFACE SEALING - The orientation and packing of dispersed soil particles in the immediate surface layer of the soil, rendering it relatively impermeable to water.

SURFACE SOIL - The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils and ranging in depth from 3 or 4 inches to 8 or 10. Frequently designated as the "plow layer," the "Ap layer," or the "Ap horizon."

SYMBIOSIS - The living together in intimate association of two dissimilar organisms, the cohabitation being mutually beneficial.

TALUS - Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

TARADJUNCT - Soil properties outside the range for a soil series but the properties do not affect soil behavior.

TENSIOMETER - A device for measuring the negative pressure (or tension) of water in soil in situ; a porous, permeable ceramic cup connected through a tube to a manometer or vacuum gauge.

TERRACE - (i) A level, usually narrow plain bordering a river, lake, or the sea. Rivers sometimes are bordered by terraces at different levels. (ii) A raised, more or less level or horizontal strip of earth usually constructed on or nearly on a contour and supported on the downslope side by rocks or other similar barrier and designed to make the land suitable for tillage and to prevent accelerated erosion. For example, the ancient terraces built by the Incas in the Andes. (iii) An embankment with the uphill side sloping toward and into a channel for conducting water, and the downhill side having a relatively sharp decline; constructed across the direction of the slope for the purpose of conducting water from the area above the terrace at a regulated rate of flow and to prevent the accumulation of large volumes of water on the downslope side of cultivated fields. The depth of the channel, the width of the terrace ridge, and the spacings of the terraces on a field are varied with soil types, cropping systems, climatic conditions, and other factors.

THERMAL ANALYSIS (DIFFERENTIAL THERMAL ANALYSIS) - A method of anlayzing a soil sample for constituents, based on a differential rate of heating of the unknown and standard samples when a uniform source of heat is applied.

TIGHT SOILS - A compact, relatively impervious and tenacious soil (or subsoil) which may or may not be plastic.

TILTH - The physical condition of soil as related to its ease of tillage, fitness as a seedbed, and its impedance to seedling emergence and root penetration.

TOPOSEQUENCE - A sequence of related soils that differ, one from the other, primarily because of topography as a soil-formation factor. See clinosequence.

TOPSOIL - (i) The layer of soil moved in cultivation. See surface soil. (ii) The A horizon. (iii) The A1 horizon. (iv) Presumably fertile soil material used to topdress roadbanks, gardens, and lawns.

TRANSITIONAL SOIL - A soil with properties intermediate between those of two different soils and genetically related to them.

TRUNCATED - Having lost all or part of the upper soil horizon or horizons.

TUFF - Volcanic ash usually more or less stratified and in various states of consolidation.

U

ULTIMATE PARTICLES - Individual soil particles after a standard dispersing treatment.

UNDERGROUND RUNOFF (SEEPAGE) - Water flowing toward stream channels after infiltration into the ground.

UNDIFFERENTIATED SOIL GROUPS - Soil mapping units in which two or more similar taxonomic soil units occur, but not in a regular geographic association. For example, the steep phases of two or more similar soils might be shown as a unit on a map because topography dominates the properties. See soil association and soil complex.

UNSATURATED FLOW - The movement of water in a soil which is not filled to capacity with water.

URBAN LAND - Areas so altered or obstructed by urban works of structures that identification of soils is not feasible. A miscellaneous land type.

W

WASTELAND - Land not suitable for, or capable of, producing materials or services of value. A miscellaneous land type.

WATERLOGGED - Saturated with water.

WATER-STABLE AGGREGATE - A soil aggregate which is stable to the action of water such as falling drops, or agitation as in wet-sieving analysis.

WATER TABLE - The upper surface of ground water or that level below which the soil is saturated with water; locus of points in soil water at which the hydraulic pressure is equal to atmospheric pressure.

WATER TABLE PERCHED - The water table of a saturated layer of soil which is separated from an underlying saturated layer by an unsaturated layer.

WEATHERING - All physical and chemical changes produced in rocks, at or near the earth's surface, by atmospheric agents.

WILTING COEFFICIENT - (Obsolete) A calculated value of the approximate wilting point or permanent wilting percentage.

WILTING POINT - Same as "permanent wilting percentage" as defined in standard plant physiology texts.

WINDBREAK - A planting of trees, shrubs, or other vegetation, usually perpendicular or nearly so to the principal wind direction, to protect soil, crops, homesteads, roads, etc. against the effects of wind, such as wind erosion and the drifting of soil and snow.

X

XEROPHYTES - Plants that grow in or on extremely dry soils or soil materials.

Y

YIELD, SUSTAINED - A continual annual, or periodic, yield of plants or plant material from an area; implies management practices which will maintain the productive capacity of the land.

APPENDIX A. SOIL SERIES TECHNICAL DESCRIPTIONS

This appendix presents technical descriptions of the soils mapped in the Coso Geothermal Study Area. The soils are correlated either as soil series, or as variants or taxadjuncts to a soil series. The Coso, Dunmovin, and Haiwee soils have been proposed as soil series names. Soil Taxonomic classifications are presented in Table 7-3.

Typifying pedons are located in reference to Mount Diablo baseline and meridian.

ALKO VARIANT[1]

Alko Variant soils are very shallow to shallow, well-drained soils on old dissected alluvial fans and terraces. These soils formed in alluvium of mixed origin. These soils have a clay subsoil overlying an indurated silica hardpan. Slope ranges from 5 to 30 percent.

Alko Variant soils are similar to Nebona Variant soils. They are near Nebona Variant, Joshua, Dunmovin, and Dunmovin Variant soils. Nebona Variant soils occur in similar positions in the landscape but lack argilic horizons. Joshua soils are deep, well-drained soils with a weakly cemented hardpan, occurring on old dissected alluvial fans. Dunmovin soils are deep, somewhat excessively drained sandy soils occurring on interfan drainageways, partially dissected alluvial fans and valley floors. Dunmovin Variant soils are deep, somewhat excessively drained soils with weak pans on somewhat older alluvial fans.

Typical pedon of Alko Variant cobbly loamy sand, 5 to 30 percent slopes, 1000 feet north and 2500 feet west of the southeast corner of Sec. 31, T. 21S., R. 38E.:

A1 -- 0 to 6 inches; light yellowish brown (10YR 6/4) cobbly loamy sand, brown to dark brown (10YR 4/3) moist; weak, fine granular structure; soft, very friable, nonsticky and nonplastic; very few very fine and

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1. This soil has a clayey natric horizon and an abrupt A/B2t boundary. Alko soils lack natric horizons.

fine roots; common very fine interstitial and tubular pores; 15 percent surface cobbles, 5 percent gravel; non-effervescent; mildly alkaline (pH 7.5); abrupt wavy boundary.

IIB21t -- 6 to 9 inches; brown to dark brown (7.5YR 4/4) clay, yellowish brown (10YR 4/4) moist; strong fine columnar structure (1/4 inch bleached caps on top of columns and tongues down the structure planes); hard, firm, very sticky and very plastic; few fine and common medium roots; common fine horizontal tubular pores; 5 percent gravel; common moderately thick clay films in bridges between mineral grains; non-effervescent; mildly alkaline (pH 7.8); abrupt wavy boundary.

IIB22t -- 9 to 12 inches; brown to dark brown (7.5YR 4/4) gravelly clay loam, dark brown (7.5YR 4/4) and yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; many very fine interstitial and tubular pores; many moderately thick clay films bridging mineral grains, many thick clay films lining pores; 25 percent gravel; non-effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.

IIC1si -- 12 to 18 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse platy structure; extremely hard, extremely firm, stick and plastic; 30 percent gravel; slightly effervescent; few filaments of lime; moderately alkaline (pH 7.9); clear smooth boundary.

IIC2sicam -- 18 to 60 inches; dark yellowish brown (10YR 4/4) duripan indurated by silica and lime, brown to dark brown (7.5YR 4/4) moist; massive; extremely hard and extremely firm; many very fine and few fine roots form a mat on top of the duripan; violently effervescent; mildly alkaline (pH 7.6).

Depth to the duripan ranges from 8 to 20 inches. The B2t horizon has hue of 7.5YR and 10YR; value of 4 or 5 dry and 4 or 5 moist. Some pedons

have a vesicular ashy A2 horizon. Rock fragments in the IIB22t and IIC1si ranges from 15 to 30 percent. Pressure faces occur in the B2t in some pedons. Rock fragments of the A1 and B21t horizon ranges from 5 to 20 percent. Exchangeable sodium is 14 to 17 percent. The duripan ranges from noneffervescent to violently effervescent. The IIC2sicam horizon has hue of 10YR and 7.5YR, value of 4 to 7 dry and 4 or 5 moist.

ARIZO SERIES

The Arizo series consists of deep, excessively drained, sandy soils in lower-elevation boulder-strewn alluvial valleys, and in the narrow drainageways of dissected alluvial fans of the Coso Range. These soils formed in mixed bouldery granitic and andesitic alluvium. Slope ranges from 2 to 5 percent.

Arizo soils are similar to Dunmovin soils. They are near Joshua Variant, and Lavic soils. Dunmovin soils are somewhat excessively drained, sandy soils occurring on lower alluvial valleys and plains of Rose Valley and on upper alluvial fans of the Sierra Nevada. Joshua Variant is a finer textured soil with a weakly cemented pan, and it occurs on the crests and sideslopes of dissected alluvial fans. Lavic is a deep, well-drained stratified soil occurring in the broad valley bottoms of Rose Valley and Coso Basin.

Typical pedon of Arizo very bouldery loamy sand, 2 to 5 percent slopes, 1500 feet east and 500 feet south of the northwest corner of Sec. 33, T.21S., R. 38E.:

A1 -- 0 to 5 inches; brown (10YR 5/3), very bouldery loamy sand; dark grayish brown (10YR 4/2) moist; single-grained; loose, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 40 percent surface boulders and stones, 5 percent gravel; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C1 -- to to 11 inches; pale brown (10YR 6/3) very bouldery loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 30 percent boulders and stones, 10 percent cobbles, 5 percent gravel; noneffervescent; moderately alkaline (pH 8.0); gradual smooth boundary.

C2 -- 11 to 60 inches; light yellowish brown (10YR 6/4) very bouldery loamy coarse sand, brown to dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial pores; 30 percent boulders and stones, 10 percent cobbles, and 5 percent gravel; noneffervescent; moderately alkaline (pH 8.0).

Boulder and stone surface cover ranges from 35 to 45 percent, inclusive. Gravel content of the profile ranges from 0 to 5 percent. Boulder and stone content of the profile ranges from 35 to 50 percent. Thickness of the surface layer varies from 3 to 5 inches. The A horizon has values of 5 or 6 dry. Some pedons have slight accumulations of carbonates in their lower parts.

COSO SERIES[1]

The Coso series consists of shallow to very shallow, somewhat excessively drained soils on mountainous uplands of the Coso Range. These soils formed in residual material weathered from granite. Slope ranges from 15 to 50 percent. Coso soils are similar to the Haiwee and Shoken soils and occur near the Coso Variant and Haiwee soils. Haiwee soils are shallow, somewhat excessively drained soils occurring on granitic uplands, and are 8 to 20 inches to weathered fractured granite. Shoken soils are 3 to 10 inches in depth to a paralithic contact, and have a mesic temperature regime. Coso Variant soils are deep, well-drained soils formed in

granitic talus and colluvium occurring on toe slopes of granitic uplands of the Coso Range.

Typical pedon of Coso stony sandy loam, 15 to 50 percent slopes, 1000 feet north and 1000 feet west of the southeast corner of Sec. 32, T.22S., R.38E.:

A1 -- 0 to 8 inches; pale brown (10YR 6/3) stony sandy loam, brown to dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 15 percent stones, 15 percent cobbles, 10 percent gravel; noneffervescent; mildly alkaline (pH 7.6); clear wavy boundary.

C1r -- 8 to 21 inches; weathered fractured granite; sandy clay loam in fractures; common very fine and fine and few medium roots in fractures; slightly effervescent with few seams of lime; moderately alkaline; diffuse irregular boundary.

C2r -- 21 to 60 inches; weathered fractured granite; sandy loam and loamy sand in fractures; noneffervescent; moderately alkaline.

Stones and cobbles constitute 20 to 35 percent of the A horizon. Gravel constitutes 5 to 15 percent of the A horizon. Weathered, fractured rock occurs at 8 to 20 inches. Fractures in the rock contain soil material of loamy sand, sandy loam, sandy clay loam, or clay loam texture, which may have common, thin clay films on ped faces.

COSO VARIANT

Coso Variant soils consist of moderately deep, well-drained soils on toeslopes of granitic uplands of the Coso Range. These soils formed in granitic talus and colluvium. Slope ranges from 15 to 30 percent.

Coso Variant soils are near Haiwee and Coso soils. Haiwee soils are shallow, somewhat excessively drained soils on granitic uplands of the

Coso Range. Coso soils are shallow to moderately shallow, well-drained soils on weathered granitic uplands.

Typical pedon of Coso Variant very stony sandy loam, 15 to 30 percent slopes, 2000 feet east and 2000 feet south of the northwest corner of Sec. 33, T.21s., R.38E.:

A1 -- 0 to 3 inches; pale brown (10YR 6/3) very stony sandy loam, brown to dark brown (10YR 4/3) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine interstitial pores; 20 percent stones, 20 percent cobbles, and 20 percent gravel; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C1 -- 3 to 12 inches; yellowish brown (10YR 5/4) very stony loam, brown to dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common very fine interstitial pores; 20 percent stones, 20 percent cobbles, and 20 percent gravel; noneffervescent; mildly alkaline (pH 7.8); clear wavy boundary.

C2ca -- 12 to 32 inches; light yellowish brown (10YR 6/4) extremely stony loam, brown to dark brown (10YR 4/3) moist; massive; soft, very friable; nonsticky and nonplastic; common medium roots; common very fine interstitial pores; slightly effervescent with common fine seams of lime; 25 percent stones, 25 percent cobbles, and 25 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

C3r -- 32 to 60 inches; light yellowish brown (10YR 6/4) weathered granite that crushes to loamy coarse sand; massive; very hard, few medium and coarse roots in fractures; some secondary silica cementation; noneffervescent; mildly alkaline (pH 7.5).

R -- 60+ inches fractured granitic rock.

Soil depth ranges from 20 to 60 inches; stones and cobbles range from 40 to 50 percent of the soil; gravel content ranges from 20 to 30 percent of the soil.

DUNMOVIN

The Dunmovin series consists of deep, somewhat excessively drained, sandy soils on partially dissected alluvial fans and valley floors. The soil also occurs along narrow drainageways of the upper, more strongly dissected alluvial fans, and on wind-blown sands over cinder deposits and basalt flows. These soils formed in alluvium from mostly granitic sources and in wind-blown sand deposits. Areas of this soil occurring on upper dissected alluvial fans of the Sierra Nevada have a bouldery surface. Slopes range from 0 to 15 percent.

Dunmovin soils are similar to Dunmovin Variant, Maynard Lake, Stumble, and Wasco Variant soils. They are near Nebona Variant, Alko Variant, Garlock, Garlock Variant, and Lavic soils. Dunmovin soils also occur adjacent to playa areas. Dunmovin Variant soils are deep, somewhat excessively drained, sandy soils occurring on slightly older alluvial fans, with a weakly cemented horizon starting at depths of 35 to 40 inches. Maynard Lake soils occur in upland rhyolitic tuff deposits of the Coso Range and have 15 to 35 percent ash, cinders, and glass fragments. Stumble soils are in upland rhyolitic tuff deposits and are mesic. Wasco Variant is similar to the Dunmovin soil except that it has a weakly cemented pan at 15 to 20 inches. Nebona Variant and Alko Variant are soils with hardpans occurring mostly on the crests and sideslopes of strongly dissected old alluvial fans. Garlock soils have a fine-loamy control section and occur on upper alluvial fans of the Sierra Nevada. Garlock Variant soils are fine-textured and occur on cinder deposits and basalt flows. Lavic soils are stratified soils formed in lower alluvial fans and valley fill materials.

Typical pedon of Dunmovin loamy coarse sand, 0 to 5 percent slopes, 750 feet east and 2000 feet south of the northwest corner of Sec. 26, T.21S., R.37E.:

A1 -- 0 to 3 inches; pale brown (10YR 6/3) loamy, coarse sand, dark brown (10YR 3/3) moist; weak fine granular structure; soft very friable

nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 5 percent gravel; noneffervescent; mildly alkaline (pH 7.8); gradual smooth boundary.

C1 -- 3 to 29 inches; yellowish brown (10YR 5/4) loamy coarse sand, brown to dark brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots; few fine tubular pores; 10 percent gravel; noneffervescent; moderately alkaline (pH 7.9); clear smooth boundary.

C2ca -- 29 to 72 inches; light yellowish brown (10YR 6/4) loamy, coarse sand, brown to dark brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many fine tubular pores; 15 percent gravel; strongly effervescent with disseminated lime; moderately alkaline (pH 8.1).

The surface ranges from nonstony to a 10 percent surface cover of boulders. Some pedons are noncalcareous throughout. Reaction in the A horizon ranges from mildly to moderately alkaline, and from neutral to moderately alkaline in the C horizon. Clay lamellae occur in some pedons. The A horizon has hue of 10YR, value of 5 or 6 dry and 3 to 5 moist. The C horizon has hue of 10YR, value of 5 or 6 dry and 4 or 5 moist, and chroma of 3 or 4. Texture of the control section is loamy coarse sand, gravelly loamy coarse sand, coarse sand, and gravelly coarse sand. Gravel content is from 5 to 15 percent.

DUNMOVIN VARIANT

Dunmovin Variant soils consist of deep, somewhat excessively drained, sandy soils on somewhat older alluvial fans. These soils formed in predominantly granitic alluvium and wind-blown sand deposits and have a weakly cemented horizon at depths varying from 35 to 40 inches. Slope ranges from 2 to 9 percent.

Dunmovin Variant soils are similar to Wasco Variant soils. They are near Alko Variant and Nebona Variant soils. Wasco Variant soils are deep, well-drained, sandy soils on slightly older alluvial fans with a weakly cemented horizon occurring at a shallower depth. Wasco variant soils also have a coarse-loamy control section texture. Alko Variant soils are shallow, well-drained soils with an argillic horizon and a duripan occurring on old alluvial fans. Nebona Variant soils are shallow, well-drained soils with a duripan also occurring on old alluvial fans. Nebona Variant soils lack an argillic horizon.

Typical pedon of Dunmovin Variant loamy sand, 2 to 9 percent slopes, 1000 feet south and 2000 feet east of the northwest corner of Sec. 21, T.22S., R.38E.:

A1 -- 0 to 4 inches; pale brown (10YR 6/3) loamy sand, brown to dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; many fine interstitial pores; noneffervescent; mildly alkaline (pH 7.8); diffuse smooth boundary.

C1 -- 4 to 36 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; few fine and medium roots; common fine interstitial pores; noneffervescent; mildly alkaline (pH 7.8); clear smooth boundary.

C2si -- 36 to 50 inches; light yellowish brown (10YR 6/4) weakly cemented heavy loamy sand; yellowish brown to dark yellowish brown (10YR 4.5/4) moist; massive; hard, friable, nonsticky and nonplastic; few medium roots; few fine interstitial pores; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary.

C3 -- 50 to 72 inches; light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; common fine interstitial pores; noneffervescent; mildly alkaline (pH 7.4).

Depth to the top of the weakly cemented horizon ranges from 35 to 40 inches. The A horizon has hue of 10YR, value of 4 or 5 moist, and chroma of 3 or 4 dry. Loamy sands are poorly graded throughout the horizon. Reaction of the A horizon ranges from mildly to moderately alkaline.

GARLOCK SERIES

The Garlock series consists of deep, well-drained soils on old dissected alluvial fans of the east side of the Sierra Nevada. These soils are formed in predominantly granitic alluvium. Slope ranges from 9 to 15 percent.

Garlock soils are similar to Garlock Variant soils. They are near Dunmovin soils. Garlock Variant soils have a fine instead of fine-loamy control section, and are underlain by volcanic cinders or basalt. Dunmovin soils are somewhat excessively drained, sandy soils occurring on alluvial fans along drainageways, and on valley floors.

Typical pedon Garlock cobbly loamy coarse sand, 9 to 15 percent slopes, 2500 feet east of the southwest corner of Sec. 3, T.22S., R.37E.:

A1 -- 0 to 6 inches; brown (10YR 5/3) cobbly loamy coarse sand, brown to dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 7 percent cobbles, 5 percent gravel; noneffervescent; moderately alkaline (pH 7.9); clear smooth boundary.

B1t -- 6 to 11 inches; brown (7.5 YR 5/4) gravelly coarse sandy loam, brown to dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and medium horizontal roots concentrated along top of horizon; few fine tubular pores; 15 percent gravel; common thin clay films in bridges between mineral grains; noneffervescent; moderately alkaline (pH 7.9); gradual smooth boundary.

B2t -- 11 to 22 inches; reddish brown (5YR 5/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; strong medium subangular blocky structure; very hard, firm, very sticky and very plastic; few fine roots; common fine tubular pores; 15 percent gravel; common moderately thick clay films on faces of peds; noneffervescent; mildly alkaline (pH 7.6); gradual smooth boundary.

B3t -- 22 to 30 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse angular blocky structure; hard, firm, sticky and plastic; very few fine roots; few fine tubular pores; 15 percent gravel; few thin clay films in bridges between mineral grains; noneffervescent; neutral (pH 7.3); gradual smooth boundary.

C -- 30 to 60 inches; yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable; nonsticky and nonplastic; 20 percent gravel; noneffervescent; neutral (pH 7.2).

The A horizon has hue of 10YR and value of 5 or 6 dry. It ranges in texture from coarse sandy loam to loamy coarse sand. Surface cobbles range from 5 to 10 percent, with 5 to 10 percent gravel, and 0 to 2 percent stones.

The Bt horizons have hue of 5YR, 7.5YR, and 10YR, value of 5 or 6, and chroma of 3 or 4. Clay content of the control section ranges from 20 to 35 percent. Texture of the Bt horizons are sandy clay loam and gravelly sandy loam. Gravel content of the control section ranges from 10 to 20 percent, with 0 to 5 percent cobbles.

The C horizon is gravelly coarse sandy loam and sandy clay loam in places. Gravel content ranges from 10 to 35 percent with 0 to 5 percent cobbles.

GARLOCK VARIANT

Garlock Variant consists of moderately deep, well-drained soils on basalt flows and cinder deposits overlain by wind-blown sands. These soils formed in volcanic cinders and basalt lava flows. Slope ranges from 5 to 15 percent.

Garlock Variant soils are similar to the Garlock series and Gass Variant soils. They are near Lavic, Gass Variant, Dunmovin soils, Cinder Land, and Playas. Garlock soils have a fine-loamy control section and are underlain by mixed alluvium of predominantly granitic origin. Gass Variant is a well-drained soil. They occur on upland mesa basalt flows, with a fine-textured B horizon of predominantly montmorillonitic. minerology. Lavic soils are deep, nearly level, well-drained soils occurring on valley bottoms and basins. Dunmovin soils are deep, somewhat excessively drained soils occurring on alluvial fans.

Typical pedon of Garlock Variant cobbly loamy sand, 5 to 15 percent slopes, 1000 feet south and 1000 feet east of the northwest corner of Sec. 30, T.22S., R. 38E.:

A11 -- 0 to 1 inch; pale brown (10YR 6/3) cobbly loamy sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; common fine roots, common very fine and fine random interstitial pores; 45 percent gravel, 10 percent cobbles; noneffervescent; mildly alkaline (pH 7.8); abrupt smooth boundary.

A12 -- 1 to 6 inches; pale brown (10YR 6/3) loamy sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; common very fine and fine random interstitial pores; 5 percent gravels; noneffervescent; mildly alkaline (pH 7.8); clear smooth boundary.

II B1t -- 6 to 12 inches; yellowish brown (10YR 5/4) clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly

hard, friable, sticky and plastic; few very fine roots; common very fine continuous horizontal tubular pores; 5 percent gravels; few thin clay films in bridges between mineral grains; noneffervescent; mildly alkaline (pH 7.8); clear wavy boundary.

II B2t -- 12 to 21 inches; yellowish brown (10YR 5/4) clay loam, brown (10YR 5/3) moist; strong medium prismatic structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine continuous tubular horizontal pores; 5 percent gravels, many moderately thick clay films lining ped faces; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary.

II B3tca -- 21 to 32 inches; reddish yellow (7.5YR 6/6) clay loam, brown to dark brown (7.5YR 4/4) moist; weak coarse prismatic structure; hard, firm, very sticky and very plastic; few very fine and fine roots; many very fine tubular pores; 5 percent gravels; violently effervescent; common medium irregularly shaped seams of lime; moderately alkaline (pH 7.9); abrupt wavy boundary.

III C1 -- 32 inches; reddish brown (5YR 4/3) loamy coarse sand in cinders; dark reddish brown (5YR 3/4) moist; single grain, loose, non-sticky and nonplastic; few very fine and fine roots; common fine and medium interstitial pores; noneffervescent; silica and calcium laminations on cemented cinders; moderately alkaline (pH 8.2).

The A horizon has hue of 10YR, value of 6 or 7 dry and 4 or 6 moist; and chroma of 2 to 4. Some pedons have a vesicular ashy A2 horizon. The B2t horizon has hue of 10YR, value of 5 or 6 dry and 4 or 5 moist; and chroma of 4 to 6. The B3 horizon overlies discontinuous lenses of welded rhyolitic tuff at 18 to 30 inches in some pedons. Depth to a lithic contact with basalt or cinders ranges from 26 to 40 inches. Surface gravel content ranges from 35 to 45 percent, and surface cobble cover ranges from 10 to 20 percent.

GASS VARIANT*

The Gass Variant is a moderately deep, well-drained, fine-textured soil on basalt. It is formed in residual material weathered from fractured basalt. Rock outcrops cover up to 5 percent of the surface area. Slope ranges from 5 to 15 percent.

The Gass Variant soils are similar to the Garlock Variant soils. They are near the Garlock Variant, Lavic, and Sparkhule soils, and Playa areas. Garlock Variant soils are moderately deep, well-drained soils on basalt flows and volcanic cinder deposits. They do not have an abrupt A-B boundary and are commonly overlain by wind-blown sand. Lavic soils are deep, nearly level, well-drained stratified soils occurring on valley bottoms and basins. Sparkhule soils are shallow, well-drained soils on basalt and basaltic cinder cones.

Typical pedon of Gass Variant cobbly fine sandy loam, 5 to 15 percent slopes, 1250 feet east of the northwest corner of Sec. 9, T.23S., R.38E.:

A1 -- 0 to 5 inches; brown (10YR 5/3) cobbly fine sandy loam, brown to dark brown (10YR 4/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and plastic; common fine roots; many very fine interstitial pores and few very fine tubular pores; 25 percent cobbles, 10 percent stones, and 5 percent gravel; noneffervescent; mildly alkaline (pH 7.8); abrupt wavy boundary.

B2t -- 5 to 15 inches; brown to dark brown (7.5YR 4/4) clay, dark brown (7.5YR 4/3) moist; strong medium columnar parting to moderate medium angular blocky structure; hard, firm, sticky and very plastic; few fine roots; many very fine tubular pores; bleached caps on the tops of columns; 5 percent gravel; many moderately thick clay films coating ped faces; noneffervescent; moderately alkaline (pH 7.9); clear wavy boundary.

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* - This soil is 20 to 40 inches to hard basalt rock; the Gass soils lack bedrock within 60 inches.

B3tca -- 15 to 23 inches; dark yellowish brown (10YR 4/4) clay, brown to dark brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, sticky and very plastic; many very fine tubular pores; 5 percent gravel; common thin clay films coating ped faces; slightly effervescent lime with segregated in common rounded fine soft masses; moderately alkaline (pH 8.0); clear irregular boundary.

Cca -- 23 to 40 inches; dark yellowish brown (10YR 4/4) very stony clay loam, brown to dark brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; few fine tubular pores; 30 percent stones, 10 percent cobbles, and 5 percent gravel; strongly effervescent with disseminated lime and carbonates coating lower rock surfaces; moderately alkaline (pH 8.0).

R -- 40 inches; fractured basalt.

Some pedons have a vesicular ashy A2 horizon. The B2t horizon has hue of 7.5YR and 10YR; value of 4 to 6 dry and 4 or 5 moist; and chroma of 3 or 4. Depth to a lithic contact ranges from 20 to 40 inches. Gravel content of the solum ranges from 5 to 10 percent. Reaction of the B horizon ranges from mildly to moderately alkaline. Stones and cobbles constitute 10 to 45 percent of the A horizon, 35 to 45 percent of the Cca horizon.

HAIWEE SERIES*

The Haiwee series consists of shallow, somewhat excessively drained soils on mountainous uplands of the Coso Range. These soils formed in granite and andesite bedrock. Slope ranges from 15 to 50 percent.

Haiwee soils are similar to Coso and Shoken soils. They are near Coso soils and granitic rock outcrops. Coso and Shoken soils also occur on mountainous uplands, but are shallow, somewhat excessively drained soils overlying highly weathered fractured granitic rock. Coso soils occur on

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* Proposed series

slopes ranging from 15 to 50 percent. Shoken soils have a mesic temperature regime and occur at elevations above 4800 feet.

Typical pedon of Haiwee very stony sandy loam, 15 to 50 percent slopes, 250 feet south and 1000 feet west of the northeast corner of Sec. 3, T.22S., R.38E.:

A1 -- 0 to 2 inches; pale brown (10YR 6/3) very stony sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, friable, slightly sticky and nonplastic; few fine roots; 20 percent surface stones and boulders, 15 percent cobbles, 25 percent gravel; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C1 -- 2 to 10 inches; light yellowish brown (10YR 6/4) very stony, sandy loam; brown to dark brown (10YR 4/3) moist; massive; soft, friable, nonsticky and nonplastic; few fine roots; 10 percent stones and boulders, 10 percent cobbles, 20 percent gravel; noneffervescent; moderately alkaline (pH 8.0); abrupt, irregular boundary.

R -- 10 inches; very hard fractured granite, roots in fractures.

Depth to bedrock is usually about 10 inches, but ranges from 8 to 20 inches. Surface stoniness ranges from 10 to 50 percent. Rock fragment content of the control section ranges from 35 to 70 percent. Stones and boulders range from 10 to 20 percent, cobbles from 10 to 20 percent, and gravels from 20 to 35 percent. The A horizon is stony sandy loam, very stony sandy loam, gravelly sandy loam, and coarse sandy loam. It is from 2 to 8 inches thick. The A horizon has hue of 10YR, value of 5 or 6 dry and 4 or 5 moist, and chroma of 2 or 3. Thickness of the C horizon ranges from 5 to 14 inches. The subsoil has hue of 10YR, value of 5 or 6 dry and 4 or 5 moist, and chroma of 2 to 4. Texture of the C horizon ranges from stony or gravelly loam, stony or gravelly sandy loam, and gravelly sandy clay loam.

HAIWEE VARIANT'

The Haiwee Variant soils consist of shallow, somewhat excessively drained soils on mountainous uplands of the Coso range. These soils formed in andesite bedrock. Slope ranges from 30 to 50 percent.

Haiwee Variant soils are similar to Haiwee soils. Haiwee soils are also shallow, somewhat excessively drained soils but occur on lower elevation granitic uplands and have a thermic temperature regime.

Typical pedon of Haiwee Variant very stony loam, 30 to 50 percent slopes, 2000 feet south and 2000 feet west of the northeast corner of Sec. 30, T.21S., R.38E.:

A1 -- 0 to 3 inches; grayish brown (10YR 5/2) very stony loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots; many fine interstitial pores; 45 percent cobbles and stones, 20 percent gravel; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary.

C1 -- 3 to 15 inches; grayish brown (10YR 5/2) stony heavy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine, and few medium roots; 45 percent cobbles and stones, 20 percent gravel; strongly effervescent with disseminated lime; moderate alkaline (pH 8.0); abrupt wavy boundary.

R -- 15 inches; hard fractured andesite.

Depth to a lithic contact ranges from 10 to 20 inches. Stone and cobble content of the profile ranges from 30 to 50 percent, and gravel content ranges from 20 to 35 percent.

HAYBOURNE SERIES[1]

The Haybourne series consists of deep, well-drained, sandy soils on lesser sloping higher elevation intermountain valleys and swales of the Coso Range. These soils also occur around higher elevation internally drained playa areas. These soils formed in alluvial material weathered from rhyolitic tuff, volcanic ash deposits, mixed alluvium and cinders. Slope ranges from 5 to 15 percent.

Haybourne soils are similar to and near Maynard Lake soils. They are also near the Coso soils. Maynard Lake soils have a deep, somewhat excessively drained profile and are slightly coarser textured and lighter colored in their surface horizons and have soil temperatures above 59°F. Maynard Lake soils occur in upland valleys and basins of the Coso Range. Coso soils are predominantly shallow, well-drained soils on granitic uplands of the Coso Range.

Typical pedon of Haybourne loamy sand, 5 to 15 percent slopes, 1500 feet south and 2000 feet west of the northeast corner of Sec. 36, T.22S., R.38E.:

A11 -- 0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine roots, many fine interstitial pores; 10 percent gravel; noneffervescent; mildly alkaline (pH 7.4); clear smooth boundary.

A12 -- 3 to 9 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; noneffervescent; 10 percent gravel; mildly alkaline (pH 7.4); diffuse smooth boundary.

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1. These soils lack carbonates in the C horizon, have higher soil temperatures, and longer frost-free season, and probably lower moisture supply than typical of the series.

B21 -- 9 to 27 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; noneffervescent; 5 percent gravel; neutral (pH 7.2); diffuse smooth boundary.

B22 -- 27 to 45 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; 5 percent gravel; nonefferves-cent; neutral (pH 7.2); diffuse smooth boundary.

C -- 45 to 60 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; soft, friable, nonsticky and nonplastic; few fine roots; 5 percent gravel; noneffervescent; mildly alkaline (pH 7.6).

Soil depth is greater than 60 inches. The A horizon has a hue of 10YR; value of 4 or 5 dry and 3 or 4 moist, and chroma of 2 or 3. Texture is loamy sand or light sandy loam. Texture of the B horizon ranges from light to heavy sandy loam. Reaction of the A horizon ranges from neutral to mildly alkaline. Gravel content of the entire profile ranges from 5 to 15 percent, but is commonly 10 percent, composed predominantly of cinders.

HOOTEN VARIANT

Hooten Variant soils are well-drained, shallow soils over a duripan on older, strongly dissected alluvial fans of Rose Valley. These soils formed in granitic and andesitic colluvium and alluvium. These soils are bouldery on the upper alluvial fans. Slope ranges from 5 to 15 percent.

Hooten Variant soils are similar to Nebona Variant soils. They are near Nebona Variant, Alko Variant, and Dunmovin soils. Nebona Variant soils are very shallow to shallow, well-drained soils with a hardpan occurring on dissected alluvial fans. Alko Variant soils are similar to Nebona Variant soils, but have an argillic horizon and an abrupt A/B2t

boundary. Dunmovin soils are deep, somewhat excessively drained, sandy soils occurring on lower alluvial fans of Rose Valley.

Typical pedon for Hooten Variant bouldery loamy fine sand, 5 to 15 percent slopes, 900 feet south and 200 feet east of the northwest corner of Sec. 30, T.21S., R.38E.:

A11 -- 0 to 4 inches; brown (10YR 5/3) bouldery loamy fine sand, brown to dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 5 percent boulders, 10 percent stones, 20 percent cobbles, and 5 percent gravel; noneffervescent; mildly alkaline (pH 7.7); clear wavy boundary.

IIA12 -- 4 to 11 inches; pale brown (10YR 6/3) cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine, and very few medium roots; many very fine tubular pores; 2 percent boulders, 2 percent stones, 10 percent cobbles, and 5 percent gravel; noneffervescent; mildly alkaline (pH 7.7); abrupt wavy boundary.

IIIC1si -- 11 to 15 inches; yellowish brown (10YR 5/4) discontinuous, strongly silica-cemented duripan and finely stratified cobbly sandy loam, brown to dark brown (10YR 4/3) moist; massive; very hard, very firm, nonsticky and nonplastic; very few medium roots; 30 percent gravel, 10 percent cobbles, 5 percent stones, 2 percent boulders; slightly effervescent with common medium seams of lime; mildly alkaline (pH 7.7); abrupt wavy boundary.

IIIC2 -- 15 to 32 inches; pale brown (10YR 6/3) very gravelly loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and very few medium roots; 35 percent gravel, 10 percent cobbles, 5 percent stones, 2 percent boulders; mildly alkaline (pH 7.8); abrupt wavy boundary.

IIIC3si -- 32 to 37 inches; light yellowish brown (10YR 6/4) very gravelly loamy coarse sand containing discontinuous weakly silica-cemented lenses and strata, yellowish brown (10YR 5/4) moist; massive; very hard, very firm, nonsticky and nonplastic; 35 percent gravel, 10 percent cobbles, 5 percent stones, 2 percent boulders; strongly effervescent, lime segregated in few fine soft masses; moderately alkaline (pH 8.0); abrupt wavy boundary.

IIIC4 -- 37 to 60 inches; yellowish brown (10YR 5/4) very gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 35 percent gravel, 10 percent cobbles, 5 percent stones, 2 percent boulders; noneffervescent; moderately alkaline (pH 8.0).

Depth to a duripan ranges from 8 to 20 inches. The A horizon has hue of 10YR; value of 5 to 7 dry. The cementation of the upper duripan ranges from weakly to strongly cemented. The IIIClsi horizon has hue of 10YR; value of 5 or 6 dry; and chroma of 3 or 4. Variably stratified layers of very gravelly and cobbly sands and loamy sands with intermittent layers of silica-cemented laminae underlie the upper duripan. The A11 horizon ranges from nonbouldery to 7 percent boulders, with a stone and cobble content ranging from 5 to 35 percent, with a gravel content of 5 to 10 percent. Cobbles in the A12 range from 5 to 20 percent, with 5 to 10 percent gravel. Gravel content of the substratum below the IIIClsi horizon ranges from 30 to 40 percent, with 5 to 25 percent cobbles, stones, and boulders.

JOSHUA VARIANT

Joshua Variant consists of deep, well-drained soils on old dissected alluvial fans of the Coso Range and Coso Basin. These soils have a weakly silica-cemented horizon in the substratum. These soils formed in alluvium predominantly of granitic origin. Slope ranges from 2 to 30 percent.

Joshua Variant soils are similar to Alko Variant soils. They are near Nebona Variant, Arizo, and Lavic soils. Alko Variant soils have an argillic horizon overlying an indurated duripan. Nebona Variant soils are well-drained soils occurring on old dissected alluvial fans with an indurated duripan. Arizo soils are deep, excessively drained, bouldery soils occurring in sandy washes of alluvial fans. Lavic soils are well-drained, variably stratified soils occurring on valley fill material.

Typical pedon of Joshua Variant sandy loam, 2 to 30 percent slopes, 1500 feet south and 500 feet west of the northeast corner of Sec. 21, T.22S., R.39E.:

A1 -- 0 to 2 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak, fine, platy structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 2 percent stones, 5 percent cobbles, 5 percent gravels; noneffervescent; neutral (pH 6.6); clear smooth boundary.

B21t -- 2 to 7 inches; yellowish brown (10YR 5/4) heavy sandy loam, brown to dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular pores; 5 percent cobbles, 10 percent gravel; common thin clay films bridging mineral grains; noneffervescent; neutral (pH 7.0); clear smooth boundary.

B22t -- 7 to 11 inches; light yellowish brown (10YR 6/4) light sandy clay loam; brown to dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocks; hard, firm, sticky and plastic; common medium roots; few fine tubular pores; 5 percent cobbles, 10 percent gravel; many moderately thick clay films lining ped faces; noneffervescent; neutral (pH 7.7); abrupt wavy boundary.

C1si -- 11 to 16 inches; light yellowish brown (10YR 6/4) containing thin discontinuous weakly silica-cemented lenses stratified with gravelly coarse sandy loam; brown (10YR 5/3) moist; massive; very hard, firm, nonsticky and nonplastic; few fine roots; 5 percent cobbles, 20 percent travel; noneffervescent; neutral (pH 6.7); abrupt wavy boundary.

C2 -- 16 to 60 inches; yellowish brown (10YR 5/4) very gravelly loamy sand; dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine roots; 10 percent cobbles, 30 percent gravel; noneffervescent; neutral (pH 6.9).

From 2 to 5 percent andesitic and granitic cobbles and stones cover the soil surface. Some pedons have a B1 horizon or contain highly weathered granitic cobbles in the subsoil. The pan is weakly silica- and clay-cemented, and is discontinuous in some pedons. Trowelled surfaces are associated with pans in some areas. Depth to the weakly cemented layer ranges from 9 to 22 inches. The control section ranges from 18 to 25 percent clay and 5 to 20 percent gravel. Cobble content of the B horizon is 2 to 10 percent. Constituent substratum gravel content in the C1 and C2 horizon ranges from 20 to 30 percent.

LAVIC SERIES

The Lavic series consists of deep, well-drained, stratified soils occurring on lower and upper alluvial fans, and on valley bottoms and interplaya flats of Rose Valley. These soils formed in alluvial valley fill. Slope ranges from 0 to 5 percent.

Lavic soils are near the Garlock Variant, Dunmovin and Wasco Variant soils. Lavic soils also occur adjacent to Playa areas. Garlock Variant soils are fine-textured soils occurring on volcanic cinders or basalt. Dunmovin soils are somewhat excessively drained, sandy soils also occurring on low-lying alluvial fans and plains. Dunmovin soils are unstratified. Wasco Variant is a somewhat excessively drained soil with a brittle,

weakly cemented horizon within a depth of 20 inches. Wasco Variant soils also occur on lower valley fill material. Playas occur on internally drained basin areas of Rose Valley.

Typical pedon of Lavic loamy sand, 0 to 2 percent slopes, 500 feet south and 500 feet west of the northeast corner of Sec. 1, T.22S., R.37E.:

A11 -- 0 to 5 inches; pale brown (10YR 6/3) loamy sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 5 percent gravel; noneffervescent; mildly alkaline (pH 7.6); abrupt smooth boundary.

IIA12 -- 5 to 16 inches; light yellowish brown (10YR 6/4) heavy sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse platy structure; hard, firm, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine random tubular pores; slightly effervescent with disseminated lime; 5 percent gravel; strongly alkaline (pH 8.5); abrupt wavy boundary.

IIIB2tb -- 16 to 20 inches; yellowish brown (10YR 5/4) sandy loam, brown to dark brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate medium angular blocks; hard, firm, slightly sticky and nonplastic; many very fine and few fine roots; common very fine random tubular pores; 5 percent gravel; few thin clay films in bridges between mineral grains; slightly effervescent with few fine seams of lime; strongly alkaline (pH 8.6); abrupt smooth boundary.

IVClca -- 20 to 39 inches; very pale brown (10YR 7/3) loam, brown to dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine roots; 5 percent gravel; strongly effervescent with disseminated lime, segregated lime in common medium seams and soft masses; strongly alkaline (pH 8.9); abrupt smooth boundary.

IVC2ca -- 39 to 56 inches; pale brown (10YR 6/3) light loamy fine sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; strongly effervescent with disseminated lime; 5 percent gravel; strongly alkaline (pH 8.5); abrupt wavy boundary.

VC3 -- 56 to 60 inches; river gravels and cobbles in a matrix of very gravelly coarse sand; massive; soft, very friable, nonsticky and nonplastic; 5 percent cobbles, 40 percent gravel; noneffervescent; strongly alkaline (pH 8.5).

The IIA12 consists of 1 to 3 weakly stratified layers of silt loam to fine sandy loam. Ash content of the IIA12 is estimated to be 10 to 20 percent. The horizon is slightly thixotropic. Calcareous layers might be depositional rather than pedogenic in some pedons of this soil. The IIA12 horizon is absent in some pedons. Stratification varies and encompasses a wide range of textures. Some pedons possess buried A and B horizons with textures of loam and clay loam. Depth to carbonates ranges from 0 to 17 inches. Stratified substrata in some pedons range from very gravelly, coarse sands to loamy very fine sand. The weighted average clay content of the control section (10 to 40 inches) ranges from 10 to 18 percent. Depth to the calcic horizon is 20-30 inches, and the horizon is 5 to 8 percent calcium carbonate equivalent.

MAYNARD LAKE SERIES

The Maynard Lake series consists of deep, somewhat excessively drained soils on lower rhyolitic dome toeslopes, ash-covered granitic uplands, sideslopes, and upland valleys and basins of the Coso Range. These soils formed in welded rhyolitic tuff and volcanic ash deposits which include other pyroclastics such as obsidian and perlite. Slopes range from 2 to 50 percent.

Maynard Lake soils are similar to Dunmovin soils. They are near the Haiwee, Coso soils, and Torriorthents. Dunmovin soils have deep, somewhat excessively drained, sandy profiles that lack the constituent ash and rhyolitic glass deposits. Dunmovin soils occur on alluvial fans and plains of the Rose and Coso Valleys. Haiwee soils are shallow, somewhat excessively drained upland soils occurring on fractured granitic bedrock. Coso soils are shallow, well-drained upland soils occurring on weathered granite and granitic colluvium. Torriorthents are well-drained, shallow to moderately deep, extremely stony soils occurring on upper sideslopes of rhyolitic domes.

Typical pedon of Maynard Lake loamy coarse sand, 15 to 30 percent slopes, 500 feet west and 2500 feet north of the southeast corner of Sec. 13, T.22S., R.38E.:

A1 -- 0 to 3 inches; grayish brown (10YR 5/2) loamy coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 10 percent gravel; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary.

C1 -- 3 to 29 inches; pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and medium roots; many very fine interstitial pores; 15 percent gravel; noneffervescent; mildly alkaline (pH 7.6); clear smooth boundary.

C2 -- 29 to 51 inches; pale brown to brown (10YR 5.5/3) gravelly, loamy sand, dark brown to dark yellowish brown (10YR 4/3.5) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 15 percent gravel; noneffervescent; mildly alkaline (pH 7.7); clear smooth boundary.

C3ca -- 51 to 72 inches; yellowish brown (10YR 5/4) gravelly loamy sand, dark brown to dark yellowish brown (10YR 4/3.5) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; many very fine interstitial pores; 20 percent gravel; slightly effervescent with disseminated lime; moderately alkaline (pH 8.0).

Gravel content of the A1 and C1 horizons ranges from 5 to 25 percent. Ash and cinder content is estimated to be 20 to 35 percent. Depth to welded tuff ranges from 60 to 72 inches. Gravel content of the C2 and C3ca ranges from 5 to 30 percent. The C horizons are noneffervescent to slightly effervescent. The A horizon has hue of 10YR; value of 5 or 6 dry, and chroma of 2 or 3. The C horizon has hue of 10YR; and value of 5 to 6.5 dry. Textures of the 10- to 40-inch control section are loamy sand, loamy coarse sand, and sand.

NEBONA VARIANT[1]

The Nebona Variant soils consist of very shallow to shallow, well-drained soils on older dissected alluvial fans. This soil formed in alluvium of mixed origin. These soils overlie an indurated silica hardpan. Slope ranges from 2 to 30 percent.

Nebona Variant soils are similar to Alko Variant soils. They are near Alko Variant, Joshua, Dunmovin, and Dunmovin Variant soils. Alko Variant soils occur in similar positions in the landscape, but have a clayey argillic horizon and an abrupt A/B2t boundary. Alko Variant soils also have an indurated hardpan at shallow to very shallow depth. Joshua soils are deep, well-drained soils with a weakly cemented hardpan, also occurring on old dissected alluvial fans. Dunmovin soils are deep, somewhat excessively drained, sandy soils occurring on interfan drainageways. Dunmovin Variant soils are deep, somewhat excessively drained soils with weak pans occurring on slightly older alluvial fans.

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1. This soil has a sandy control section and lacks carbonates in the soil above the pan. Nebona soils are loamy.

Typical pedon of Nebona Variant cobbly loamy sand, 5 to 30 percent slopes, 600 feet south and 1300 feet west of the northeast corner of Sec. 7, T.22S., R.38E.:

A1 -- 0 to 6 inches; pale brown (10YR 6/3) cobbly loamy sand, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many fine interstitial pores; 2 percent stones, 15 percent surface cobbles, 7 percent gravel; noneffervescent; moderately alkaline (pH 7.9); abrupt smooth boundary.

IIC1 -- 6 to 8 inches; light yellowish brown (10YR 5/4) clay loam, yellowish brown (10YR 5/4) moist; weak coarse platy structure; hard, firm, sticky and very plastic; common very fine roots; many fine random tubular pores; 5 percent gravel; noneffervescent; moderately alkaline (pH 8.1); abrupt wavy boundary.

IIIC2sim -- 8 to 17 inches; light yellowish brown (10YR 6/4) duripan indurated by silica, dark yellowish brown (10YR 4/4) moist; weak coarse platy structure; few fine roots in fractures; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary.

IIIC3sim -- 17 to 20 inches; light yellowish brown (10YR 6/4) duripan indurated by silica; dark yellowish brown (10YR 4/4) moist; massive; non-effervescent; moderately alkaline (pH 8.0); (backhoe could not penetrate hardpan).

Surface texture in the A1 ranges from loamy sand to gravelly sandy loam. Surface cobbles range from 5 to 15 percent. Silt films occur in the IIC1 horizon, but this horizon is absent in some pedons. The weighted average of the control section ranges from 5 to 10 percent clay, and more than 80 percent sand. Some pedons have thin vesicular horizons containing up to 20 percent clay, but these are less than 3 inches thick. Depth to the duripan indurated by silica ranges from 8 to 15 inches. The pan is

brittle when moist, and contains indurated segments up to 3 inches thick with trowelled surfaces in some pedons. Below the top of the pan are other duripans with trowelled surfaces to an indeterminate depth in some pedons. Carbonates in the form of filaments may be present in the duripan. Gravel content of the soil profile ranges from 5 to 25 percent.

SHOKEN SERIES

The Shoken series consists of shallow to very shallow, somewhat excessively drained soils on mountainous uplands of the Coso Range. These soils formed in residual material weathered from granite and granitic colluvium. Slope ranges from 30 to 50 percent.

Shoken soils are similar to Coso soils. They are near Stumble soils. Coso soils are shallow to very shallow, somewhat excessively drained soils also on mountainous uplands, but have a thermic temperature regime. Stumble soils are deep, somewhat excessively drained sandy soils occurring on ash-covered granitic uplands and toeslopes.

Typical pedon of Shoken stony, sandy loam, 30 to 50 percent slopes, 500 feet west and 1500 feet north of the southeast corner of Sec. 1, T.23S., R.38E.:

A1 -- 0 to 3 inches; pale brown (10YR 6/3) stony sandy loam, brown to dark brown (10YR 4/3) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; few fine and medium roots; many fine interstitial pores; 35 percent stones; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary.

C1r -- 3 to 15 inches; weathered granite crushing to light sandy loam; common fine and few medium roots in rock fractures; clear wavy boundary.

C2r -- 15 inches; decomposed granite.

Depth to the paralithic contact ranges from 3 to 15 inches. Depth to hard fractured granite under the paralithic contact ranges from 20 to 25 inches. The A horizon has hue of 10YR, value of 5 or 6 dry. Stones and cobbles constitute 30 to 35 percent of the A horizon. Gravel content of the A horizon ranges from 5 to 15 percent.

SPARKHULE SERIES

The Sparkhule series consists of shallow, well-drained soils on basaltic uplands and cinder cones. These soils formed in residual material weathered from basalt and basaltic scoria. Slope ranges from 5 to 30 percent.

Sparkhule soils are similar to and near Gass Variant soils. Gass Variant soils are moderately deep, well-drained soils with a fine-textured B horizon of predominantly montmorillonitic minerology, also occurring on basalt.

Typical pedon of Sparkhule very stony, loamy, fine sand, 5 to 30 percent slopes, 1500 feet south and 1000 feet east of the northwest corner of Sec. 28, T.22S., R.38E.:

A11 -- 0 to 2 inches; yellowish brown (10YR 5/6)very stony loamy fine sand, yellowish brown (10YR 5/4) moist; single grain; loose, nonsticky and nonplastic; common fine roots; few fine tubular pores; 45 percent surface cover of stones and cobbles; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary.

A12 -- 2 to 6 inches; yellowish brown (10YR 5/6) gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common fine roots; few fine tubular pores;

25 percent gravel content, 10 percent cobbles and stones; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary.

B2t -- 6 to 10 inches; strong brown (7.5YR 5/6) gravelly clay loam, brown to dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; 15 percent gravel; common moderately thick clay films lining pores; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary.

B35 -- 10 to 19 inches; strong brown (7.5YR 5/6) stony clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 15 percent stone content; common moderately thick clay films lining pores; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary.

R -- 19 inches; fractured basalt and scoria.

Depth to a lithic contact with hard volcanic rock ranges from 14 to 20 inches. Surface cover of basaltic stones and cobbles ranges from 25 to 50 percent. Gravel content of the A12 ranges from 15 to 25 percent by volume. Gravel content of the B2t ranges from 15 to 30 percent. Stone content of the B3t ranges from 15 to 35 percent, and gravel content is 15 to 35 percent.

STUMBLE SERIES

The Stumble series consists of moderately deep to deep, somewhat excessively drained soils on high-elevation rhy9litic dome toeslopes, ash-covered granitic uplands and toeslopes, and upland valleys and basins of the Coso Range. These soils formed in alluvium derived from welded rhyolitic and andesitic tuff and volcanic ash deposits which include other pyroclastics such as obsidian and perlite. Slope ranges from 2 to 50 percent.

Stumble soils are similar to Maynard Lake soils. They are near Shoken soils. Maynard Lake soils are deep, somewhat excessively drained soils occurring in similar positions in the landscape but at lower elevations. Maynard Lake soils have a thermic temperature regime. Shoken soils are shallow to very shallow, somewhat excessively drained soils on granitic uplands of the Coso Range.

Typical pedon of Stumble loamy, coarse sand, 2 to 15 percent slopes, in the center of the northwest quarter Sec. 22, T.21S., R.38E.:

A1 -- 0 to 4 inches; pale brown (10YR 6/3) loamy coarse sand, brown to dark brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine roots; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary.

C1 -- 4 to 27 inches; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine roots; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C2 -- 27 to 60 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; noneffervescent; moderately alkaline (pH 8.0).

Minerology is mixed but the soil contains moderate amounts of material from volcanic ash, glass, and other pyroclastic material. The A horizon has hue of 10YR, value of 5 or 6 dry, and chroma of 2 or 3. The C horizon has hue of 10YR, and value of 5 to 7 dry. The C horizons are nonefferves-cent to slightly effervescent. Gravel content of the C horizon ranges from 15 to 25 percent, and some of the coarse fragments are composed of pumice.

TORRIORTHENTS

Torriorthents (sandy-skeletal, mixed, thermic) consists of moderately deep, excessively drained, stony soils on rhyolite domes of the Coso Range. These soils formed in residual material weathered from rhyolite and rhyo-lite talus and colluvium, and are in some places strongly influenced by colluvial creep and deposition. Rock outcrop and Rubble land constitute 35 to 50 percent of the land area mapped with this soil. Slope ranges from 30 to 75 percent.

Torriorthents are near the Haiwee, Maynard Lake, and Coso soils. Haiwee soils are shallow, well-drained soils on mountainous granitic uplands of the Coso Range. Maynard Lake soils have deep, somewhat excessively drained profiles on lower rhyolitic dome toeslopes, granitic upland toeslopes, and upland intermountain valleys and basins of the Coso Range. Coso soils are shallow to very shallow, well-drained soils occurring on mountainous granitic uplands.

Typical pedon of Torriorthents (sandy-skeletal, mixed, thermic), 30 to 75 percent slopes, 2000 feet east and 1000 feet south of the northwest corner of Sec. 7, T.22S., R.39E.:

A1 -- 0 to 2 inches; brown (10YR 6/3) very stony sandy loam, brown to dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine roots; common very fine interstitial pores; 10 percent boulders, 30 percent stones, 10 percent cobbles, and 5 percent gravel; noneffervescent; mildly alkaline; gradual wavy boundary.

C1 -- 2 to 12 inches; pale brown (10YR 6/3) very stony sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common very fine interstitial pores; 10 percent boulders, 35 percent stones, 10 percent cobbles, and 10 percent gravel; noneffervescent; mildly alkaline; gradual wavy boundary.

C2ca -- 12 to 30 inches; very pale brown (10YR 7/3) extremely stony loamy sand, brown to yellowish brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common very fine interstitial pores; slightly effervescent; carbonates coat lower rock surfaces below approximately 12 inches; 15 percent boulders, 35 percent stones, 15 percent cobbles and 10 percent gravel; moderately alkaline; irregular boundary.

R -- 30 inches; fractured rhyolite.

Depth to a lithic contact ranges from 20 to 40 inches. Depth to vesicular carbonates coating lower rock surfaces ranges from 12 to 50 inches. The fractured rhyolitic bedrock is interbedded with welded vitric rhyolitic tuff and talus in areas. Rock fragment size ranges from small gravels to boulders 36 inches in diameter. Reaction in the A and C1 horizon ranges from mildly to moderately alkaline. Profile boulders, stones and cobbles range from 45 to 70 percent by volume. Gravel content of the profile ranges from 5 to 10 percent by volume.

WASCO VARIANT

The Wasco Variant soils consist of deep, well-drained soils on lower alluvial fans and valley fill material. These soils formed in predominantly granitic alluvium and have a brittle, weakly cemented horizon starting at depths varying from 15 to 20 inches. Slope ranges from 0 to 2 percent.

The Wasco Variant soils are similar to Dunmovin Variant soils. They are near Lavic and Dunmovin soils. Dunmovin Variant soils are deep, somewhat excessively drained, sandy soils occurring on alluvial fans, and have a weakly cemented horizon at depths starting at 35 to 40 inches. Lavic soils are deep, well-drained, stratified soils occurring on low alluvial fans, valley fill and interplaya flats. Dunmovin soils are deep, somewhat excessively drained sandy soils on lower alluvial fans and plains.

Typical pedon of Wasco Variant very fine sandy loam, 0 to 2 percent slopes, 2150 feet north and 700 feet west of the southeast corner of Sec. 2, T.22S., R.37E.:

A11 -- 0 to 5 inches; light yellowish brown (10YR 6/4) very fine, sandy loam, dark brown (10YR 3/3) moist; moderate fine platy structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many very fine tubular pores; noneffervescent; moderately alkaline (pH 7.9); clear wavy boundary.

IIA12 -- 5 to 15 inches; pale brown (10YR 6/3) coarse sandy loam, light olive brown (2.5YR 5/4) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; many fine and medium roots; common fine tubular pores; strongly effervescent with disseminated lime; moderately alkaline (pH 8.3); abrupt wavy boundary.

IIC1sica -- 15 to 35 inches; light yellowish brown (10YR 6/4) weakly cemented loamy coarse sand with few large prominent brown to dark brown (7.5YR 4/4) mottles, yellowish brown (10YR 5/4) moist; massive; extremely hard and extremely firm; nonsticky and nonplastic; very few medium roots; strongly effervescent, lime segregated in few medium-sized soft masses; moderately alkaline (pH 8.4); clear irregular boundary.

IIC2sica -- 35 to 51 inches; light yellowish brown (2.5Y 6/4) weakly cemented loamy coarse sand with common large prominent brown to dark brown (7.5YR 4/4) mottles, olive brown (2.5YR 4/4) moist; massive; extremely hard, extremely firm, nonsticky and nonplastic; strongly effervescent with few distinct small masses of lime; moderately alkaline (pH 8.2); clear wavy boundary.

IIC3ca -- 51 to 72 inches; pale brown (10YR 6/3) loamy coarse sand with few large prominent brown to dark brown (7.5YR 4/4) mottles, brown (10YR 5/3) moist; massive; very hard, very firm, nonsticky and nonplastic; strongly effervescent with many medium seams of lime; moderately alkaline (pH 7.9).

Depth to the weakly cemented pan ranges from 15 to 20 inches. Better drained pedons of this soil lack mottles. Gravel content in the C horizon ranges from 0 to 15 percent. The A horizon has hue of 10YR, value of 3 to 5 moist, and chroma of 3 or 4. The C2sica horizon has hue of 2.5Y and 10YR, value of 4 to 6 moist, and chroma of 2 to 4.

APPENDIX B

TABLE B-1. LABORATORY DATA

Soil Series, Type & Field Symbol	Sample I.D. Number	Horizon & Depth (inches)		SP	pH	EC	-SOLUBLE CATIONS-meq/l- Ca	Mg	Na	K	-EXCHANGEABLE CATIONS meq/100g- Ca	Mg	Na	K	CEC[1]	%O.C.	pH (Na F)	$CaCO_3$ Equiv[3]%	Ref #
Lavic LS	79 CA-027-201-1	A11	0-5	29	7.6	0.62	--	--	--	--	7.91	0.80	0.23	1.05	9.99	0.32	--	0.40	1
(107)	201-2	IIA12	5-16	23	8.5	1.14	0.60	0.22	10.4	0.94	12.46	1.64	4.25	4.24	22.59	0.08	10.2	0.50	2
	201-3	IIIB2tb	16-30	26	8.6	1.80	0.55	0.10	17.4	0.61	4.06	0.90	5.20	3.39	13.55	0.07	--	0.45	3
	201-4	IVC1ca	20-39	36	8.9	6.5	0.40	0.02	78.3	0.43	24.94	1.29	14.56	1.73	42.53	0.12	--	4.15	4
	201-5	IVC2ca	39-56	41	8.5	14.7	--	--	--	--	25.39	1.16	6.62	1.07	34.24	0.03	--	1.60	5
	201-6*	VC3	56-60	22	8.5	12.5	--	--	--	--	10.77	0.34	1.31	0.33	12.75	0.01	--	--	6
Garlock Variant CB-LS	S79 CA-027-202-1	A11	0-1	0-1" no sample															
(120)	202-2	A12	1-6	22	7.8	0.75	--	--	--	--	6.34	0.67	0.42	0.56	7.99	0.24	--	--	7
	202-3	IIB1t	6-12	24	7.8	0.57	0.55	0.31	4.3	0.35	8.30	2.73	1.13	0.99	13.15	0.09	--	--	8
	202-4	IIB2t	12-21	31	7.5	0.39	0.40	0.07	3.4	0.23	10.79	3.83	1.70	1.06	17.38	0.15	--	0.35	9
	202-5	IIB3tca	21-32	36	7.9	0.90	0.90	0.44	7.0	0.20	25.75	3.82	2.28	0.84	32.69	0.13	--	1.75	10
	202-6*	IIIC	32-60	44	8.2	0.35	--	--	--	--	8.30	0.96	1.64	0.44	11.34	0.09	--	0.65	11
Haybourne LS	S79 CA-027-207-1	A11	0-3	29	7.4	0.23	--	--	--	--	1.22	0.66	0.05	0.38	2.31	0.12	9.7	--	12
(170)	207-2	A12	3-9	29	7.4	0.17	--	--	--	--	2.73	0.91	0.12	0.48	4.24	0.10	9.6	--	13
	207-3	B21	9-27	28	7.2	0.22	--	--	--	--	2.40	1.27	0.18	0.63	6.50	0.10	9.4	--	14
	207-4	B22	27-45	28	7.2	0.16	--	--	--	--	2.82	1.44	0.19	0.88	5.33	0.10	9.2	--	15
	207-5*	C	45-60	29	7.6	0.33	--	--	--	--	5.37	1.12	0.14	0.90	9.09	0.10	9.7	--	16
Alko Variant CB-LS	S79 CA-027-209-1	A1	0-6	24	7.5	0.60	--	--	--	--	3.87	0.73	0.23	0.66	5.49	0.15	10.0	--	17
	209-2	B21t	6-9	42	7.8	0.60	0.45	0.04	5.7	0.10	17.86	3.84	4.69	1.00	27.39	0.17	9.6	--	18
	209-3	B22t	9-12	34	8.0	0.66	0.45	0.02	6.1	0.10	18.69	3.97	5.59	0.89	29.14	0.18	--	--	19
	209-4	B3si	12-18	34	7.9	2.9	--	--	--	--	17.34	2.36	3.42	0.52	23.64	0.11	--	--	20
	209-5*	C1sicam	18-60	32	7.6	6.4	--	--	--	--	20.16	1.75	2.21	0.35	24.47	0.07	--	--	21

[1]C. E. C. calculated by summing Ca, Mg, Na, and K.

[2]Most laboratory particle size determinations appear to be about 10% sandier than field estimations. The soils contain from 5 to 30% gravel sized pumice fragments. These weak fragments appear to have been degraded to sand sized classes during mechanical soil sample preparation.

Soil Series, Type & Field Symbol	Sample I.D. Number	Horizon & Depth (Inches)	SP	pH	EC	-SOLUBLE CATIONS-meq/l- Ca	Mg	Na	K	-EXCHANGEABLE CATIONS meq/100g- Ca	Mg	Na	K	CEC[1]	%O.C.	pH (Na F)	$CaCO_3$ Equiv %	Ref #
Cass Variant CB-FSL	S79 CA-027-211-1	A1 0-5	28	7.8	0.84	1.0	0.72	5.7	0.51	8.70	2.72	1.07	0.96	13.45	0.20	--	--	41
(220)	211-2	B2t 5-15	55	7.9	1.52	0.85	0.40	11.7	0.23	14.50	6.42	4.78	1.26	26.96	0.12	--	0.05	42
	211-3	B3tca 15-23	56	8.0	6.3	6.49	3.95	39.1	0.48	23.75	6.49	5.42	0.88	36.54	0.09	--	1.00	43
	211-4	Cca 23-40	42	7.6	15.0	--	--	--	--	34.56	5.82	6.32	0.63	47.33	0.05	--		44
	211-5*	R 40	Not Sampled															
Maynard Lake LCOS	S79 CA-027-205-1	A1 0-3	36	7.5	0.47	--	--	--	--	3.27	0.85	0.07	0.98	6.20	0.14	9.7	--	45
(141)	205-2	C1 3-29	31	7.6	0.24	--	--	--	--	2.89	1.2	0.19	0.94	7.30	0.07	9.4	--	46
	205-3	C2 29-51	35	7.7	0.35	--	--	--	--	2.88	1.11	0.17	0.74	6.85	0.04	9.5	0.30	47
	205-4*	C3ca 51-72	35	8.0	0.50	--	--	--	--	18.23	1.22	0.29	0.33	23.32	0.05	10.3	0.95	48
Coso ST-SL	S79 CA-027-203-1	A1 0-8	30	7.6	0.50	--	--	--	--	5.52	1.47	0.09	0.84	9.09	0.20	--	--	52
(131)	203-2	C1r 8-21	Not Sampled															
	203-3*	C2r 21-60	Not Sampled															
Joshua Variant SL	S79 CA-027-212-1	A1 0-2	29	6.8	0.82	--	--	--	--	5.36	1.52	0.09	0.93	7.90	0.45	--	--	53
(190)	212-2	B21t 2-7	25	7.0	0.36	1.00	0.51	0.7	0.60	5.80	1.97	0.14	0.90	8.81	0.12	--	--	54
	212-3	B22t 7-11	24	6.7	0.28	0.80	0.28	0.7	0.43	4.97	1.35	0.14	0.67	7.13	0.05	--	--	55
	212-4	C1si 11-16	28	6.7	0.25	--	--	--	--	3.89	1.20	0.21	0.44	5.74	0.03	--	--	56
	212-5*	C2 16-66	28	6.9	0.17	--	--	--	--	3.73	1.18	0.22	0.34	5.47	0.02	--	--	57
Playa		0-4	42	7.7	10.1	--	--	--	--	--	--	--	--	--	--	--	--	58[3]
		4-12	42	7.7	16.7	--	--	--	--	--	--	--	--	--	--	--	--	59[4]
Haiwee STV-SL	S79 CA-027-213-1	A1 0-2	28	8.0	0.92	--	--	--	--	11.50	1.13	0.14	1.54	14.31	0.44	--	--	60
(131)	213-2	C1 2-10	24	8.0	0.51	--	--	--	--	8.27	1.11	0.11	1.44	10.93	0.16	--	--	61
	213-3*	R 10	Not Sampled															
Dunmovin Variant LS	S79 CA-027-215-1	A1 0-4	31	7.8	0.39	1.25	0.67	1.0	0.72	2.46	0.62	0.11	0.49	3.68	0.08	--	--	62
(181)	215-2	C1 4-36	30	7.8	0.20	0.40	0.12	0.7	0.41	2.48	1.09	0.15	0.80	4.52	0.04	--	--	63
	215-3	C2si 36-50	29	7.5	0.21	--	--	--	--	3.16	1.01	0.64	0.59	5.40	0.04	--	--	64
	215-4*	C3 50-72	27	7.4	0.39	--	--	--	--	2.82	0.92	0.49	0.57	4.80	0.02	--	--	65

[3]SAR = 10.1
[4]SAR = 8.7

Soil Series, Type & Field Symbol	Sample I.D. Number	Horizon & Depth (inches)		SP	pH	EC	-SOULABLE CATIONS-meq/l- Ca	Mg	Na	K	-EXCHANGEABLE CATIONS meq/100g- Ca	Mg	Na	K	CEC[1]	%O.C.	pH (Na F)	$CaCO_3$ Equiv %	Rf #
Nebona Variant CB-LS	S79 CA-027-208-1	A1	0-6	31	7.85	0.63	--	--	--	-	7.01	1.08	0.29	1.44	9.82	0.20	10.2	--	22
(180)	208-2	IIC1	6-8	25	8.1	0.90	0.75	0.12	7.4	0.81	9.55	2.12	2.42	2.96	17.05	0.05	9.9	--	23
	208-3	IIIC2sim	8-17	36	6.8	1.44	--	--	--	--	12.41	2.45	2.98	1.24	19.08	0.15	--	--	25
	208-4*	IIC3sim	17-20	41	6.3	1.32	--	--	--	--	10.73	1.89	2.16	0.79	15.57	0.06	--	--	26
Hooten Variant BY-LFS	S79 CA-027-210-1	A11	0-4	27	7.7	0.57	--	--	--	--	7.09	0.87	0.59	1.76	10.31	0.27	10.0	--	27
(182)	210-2	IIA12	4-11	22	7.7	0.50	--	--	--	--	5.38	1.12	0.87	0.17	7.54	0.08	9.8	--	28
	210-3	IIIC1si	11-15	30	7.7	0.45	--	--	--	--	9.94	1.23	1.58	5.30	18.05	0.09	--	0.55	29
	210-4	IIIC2	15-32	33	7.8	0.50	--	--	--	--	11.60	1.11	1.41	4.02	18.14	0.15	--	--	30
	210-5	IIIC3si	32-37	32	8.0	0.57	--	--	--	--	9.53	1.03	2.11	3.82	16.49	0.03	--	0.50	31
	210-6*	IIIC4	37-60	29	8.0	0.71	--	--	--	--	3.72	0.76	2.57	2.97	10.02	0.02	--	--	32
Dunmovin LCOS	S79 Ca-027-200-1	AL	0-3	24	7.8	0.34	--	--	--	--	3.12	0.22	0.11	0.28	4.89	0.10	--	--	33
(105)	200-2	C1	3-29	24	7.9	0.30	--	--	--	--	2.73	0.62	0.36	0.27	7.83	0.07	--	--	34
	200-3*	C2ca	29-72	25	8.1	0.40	--	--	--	--	8.92	0.77	0.20	0.25	10.14	0.06	--	0.60	35
Wasco Variant VFSL	S79 Ca-027-204-1	A11	0-5	33	7.9	1.95	3.14	0.99	11.7	2.55	8.13	0.69	0.63	0.98	10.43	0.50	9.9	--	36
(135)	204-2	IIA12	5-15	21	8.3	0.60	0.45	0.10	5.4	0.53	7.73	0.90	1.04	0.95	10.62	0.09	9.8	--	37
	204-3	IIIC1sica	15-35	26	8.4	0.55	--	--	--	--	14.96	1.71	1.32	0.99	18.98	0.06	--	--	38
	204-4	IIIC2sica	35-51	27	8.2	0.54	--	--	--	--	22.85	1.43	0.81	0.32	25.41	0.05	--	--	39
	204-5*	IIIC3ca	51-72	28	7.9	1.39	--	--	--	--	24.08	1.16	1.29	0.27	26.80	0.03	--	--	40

Reference #	1/10 Bar	1/3 Bar	15 Bar	Bulk Density	Plastic Limit	Liquid Limit	PARTICLE SIZE ANALYSIS[2] Sand %	Silt %	Clay %
1	9.6	--	2.7	--	--	--	88.6	5.2	6.2
2	--	9.8	5.8	1.55	13	14	75.6	9.4	15.0
3	--	11.6	5.6	1.55	NP	16	75.8	14.6	9.6
4	--	18.4	7.6	1.45	19	20	58.2	32.8	9.0
5	--	--	--	--	--	--	71.6	19.4	9.0
6	--	--	--	--	--	--	97.6	0.2	5.0
7	8.7	--	2.5	--	--	--	88.4	7.4	4.2
8	--	11.9	7.0	1.57	13	17	69.2	11.6	19.2
9	--	16.0	9.2	1.48	14	21	54.4	16.6	29.0
10	--	18.2	9.7	1.28	18	21	63.2	27.6	9.2
11	--	--	--	--	--	--	78.2	18.6	3.2
12	5.9	--	2.0	--	--	--	91.2	5.2	3.6
13	6.7	--	2.4	--	--	--	91.0	6.8	2.2
14	9.2	--	3.0	--	--	--	88.8	6.8	4.4
15	10.2	--	3.2	--	--	--	88.0	8.4	3.6
16	9.3	--	3.2	--	--	--	91.0	7.4	1.6
17	11.7	--	2.6	1.75	--	--	83.2	14.0	2.8
18	--	21.9	12.9	1.42	21	31	56.4	11.6	32.0
19	--	18.2	12.6	1.49	22	31	62.4	17.6	20.0
20	--	--	--	--	--	--	80.4	12.6	7.0
21	--	--	--	--	--	--	93.4	5.6	1.0

NP = Non-plastic

Reference #	1/10 Bar	1/3 Bar	15 Bar	Bulk Density	Plastic Limit	Liquid Limit	PARTICLE SIZE ANALYSIS Sand %	Silt %	Clay %
22	10.8	--	2.7	--	--	--	87.4	8.6	4.0
23	--	12.7	6.9	1.58	13	15	66.4	12.6	21.0
25	--	--	--	--	--	--	85.4	10.4	4.2
26	--	--	-	--	--	--	92.4	6.6	1.0
27	13.7		3.1	--	--	--	78.4	13.2	8.4
28	12.9		4.2	--	--	--	74.6	16.2	9.2
29	--	--	--	--	--	--	81.6	13.2	5.2
30	--	--	-	--	--	--	89.4	9.2	1.4
31	--	--	-	--	--	--	90.6	9.0	0.4
32	--	--	-	--	--	--	96.0	4.0	0.0
33	11.5		1.6	--	--	--	86.8	8.8	4.4
34	10.4		3.6	--	--	--	80.8	14.0	5.2
35	13.0		2.1	--	--	--	80.8	19.0	0.2
36	--	10.7	4.0	1.30	NP	18	66.8	24.0	9.2
37	--	7.9	3.8	1.75	NP	12	73.6	16.2	10.2
38	--	--	-	--	--	--	64.8	25.0	10.2
39	--	--	-	--	--	--	77.6	15.2	7.2
40	--	--	-	--	--	--	72.8	19.0	8.2

NP = Non-plastic

Reference #	1/10 Bar	1/3 Bar	15 Bar	Bulk Density	Plastic Limit	Liquid Limit	PARTICLE SIZE ANALYSIS Sand %	Silt %	Clay %
41	--	12.7	6.8	1.49	NP	14	66.8	21.0	12.2
42	--	23.4	14.0	--	15	28	45.8	22.4	31.8
43	--	20.1	12.0	1.34	16	22	42.6	25.4	32.0
44	--	--	--	--	--	--	61.8	30.2	8.0
45	11.9	--	4.3	--	--	--	85.8	12.2	2.0
46	22.7	--	4.3	--	--	--	80.6	16.4	3.0
47	11.7	--	4.3	--	--	--	88.4	10.4	1.2
48	11.6	--	4.6	--	--	--	88.4	11.6	0.0
52	--	6.6	3.4	--	NP	NL	87.0	8.6	4.4
53	--	10.3	4.1	1.54	NP	16	74.4	14.6	11.0
54	--	11.3	4.3	1.58	NP	15	72.4	15.4	12.2
55	--	10.1	5.0	1.64	NP	16	75.4	14.8	9.8
56	--	--	--	--	--	--	81.4	13.6	5.0
57	--	--	--	--	--	--	87.4	11.6	1.0
58	--	--	--	--	--	--	--	--	--
59	--	--	--	--	--	--	--	--	--
60	--	9.5	4.3	--	NP	19	30.4	14.6	5.0
61	--	8.9	4.1	--	NP	17	78.4	14.8	6.8
62	4.9	--	2.0	--	--	--	95.4	3.6	1.0
63	5.7	--	2.5	--	--	--	96.4	1.6	2.0
64	--	--	--	--	--	--	92.4	3.6	4.0
65	--	--	--	--	--	--	95.0	1.8	3.2

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NP = Non-plastic

NL = Non-liquid

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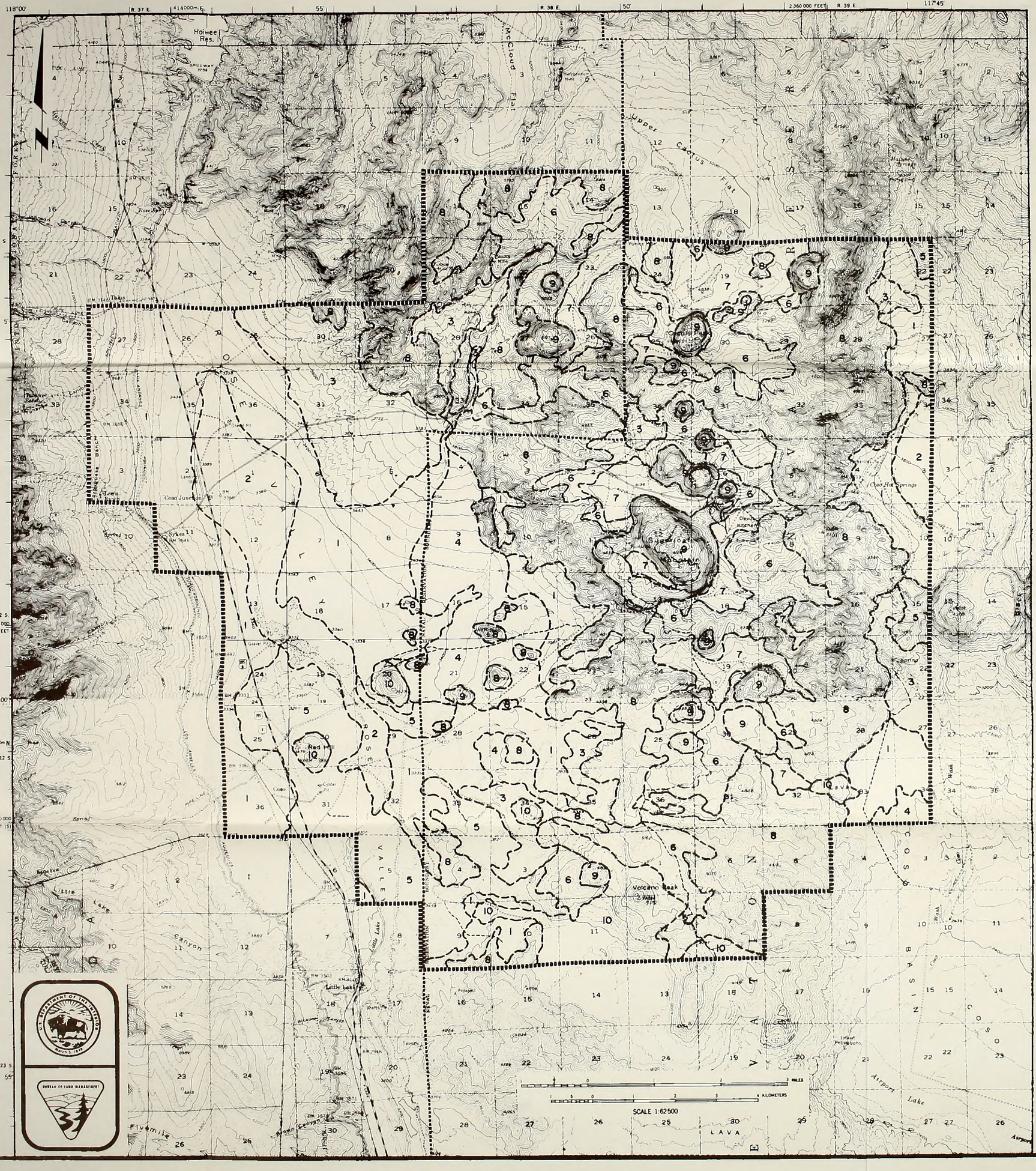

EXPLANATION

Map Symbol	DESCRIPTION
	Soils on Valley Floors, Alluvial Fans and Terraces
1	Dunmovin Deep, nearly level to moderately sloping, somewhat excessively drained sandy soils; formed in alluvium
2	Dunmovin-Lavic-Wasco Variant Very deep, nearly level, somewhat excessively to well drained sandy and loamy soils; formed in alluvium
3	Alko Variant-Joshua Variant-Nebona Variant Very shallow to deep, gently sloping to moderately steep, well drained, cobbly sandy soils with hardpans; formed in alluvium
4	Alko Variant-Dunmovin Variant-Nebona Variant Very shallow to deep, gently to moderately sloping, somewhat excessively to well drained soils with hardpans; formed in alluvium
	Soils on Uplands and Upland Basins
5	Gass Variant-Garlock Variant-Sparkhule Shallow to moderately deep, moderately sloping to moderately steep, well drained cobbly sandy and loamy soils; formed in basalt and cinders
6	Maynard Lake Stumble, steep Deep, moderately steep to steep, somewhat excessively drained sandy soils; formed in rhyolite tuff and volcanic ash deposits
7	Maynard Lake- Stumble, sloping Very deep, nearly level to strongly sloping, somewhat excessively drained sandy soils; formed in alluvium from rhyolite tuff and volcanic ash deposits
8	Coso-Rock Outcrop Very shallow to shallow, moderately steep to steep, somewhat excessively drained stony loamy soils; formed in granite; and rock outcrop
9	Rubble Land-Torriorthents-Rock Outcrop Moderately deep, steep to very steep, excessively drained stony loamy soils on rhyolite domes; rubble land and rock outcrop
10	Cinder Land-Lava Flows
	Map Unit Boundary

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PLATE - 1 GENERAL SOILS MAP

R. 37 E. R. 38 E.

Haiwee Res.

McCloud Mine

McCloud Flat

Molybdenum Mine

Upper

Pumice Mine

Haiwee Creek

Johnson Canyon

Talus

Talus Canyon

Tunawee Canyon

Tunawee Ranch

Rose Spr

Surge Tank

Haiwee Powerhouse

Gravel Pit

Landing Strip

Petroglyphs

PACIFIC

SOUTHERN

LOS ANGELES

AQUEDUCT

PIPE LINE

SPILLWAY 3759

BM 3676

BM 3839

BM 3584

BM 3650

BM 3746

VABM 6085

5970

5342

5210

5441

5414

5783

5683

5769

5218

5120

5554

5538

5193

5137

4417

4048

4160

3959

3924

3584

3582

3574

3734

3502

3454

3687

3434

3382

3516

3389

3279

3722

3783

4244

4405

4437

4211

4743

4455

4317

4211

4188

4052

4993

4988

4800

4600

4400

4200

4000

3800

3600

3400

5600

5400

5200

5000

ROSE

T. 21 S.

T. 22 S.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

104 105 106 107 108 130 131 141 142 150 155 160 180 182 183 232 233 234 240 241 242

R. 38 E. | 50' | 2 360 000 FEET | R. 39 E. | 117°45'

McCloud Mine

McCloud Flat

Molybdenum Mine

VABM 6085

Upper Cactus Flat

Pumice Mine

Pumice Mine

Pumice Mine

Petroglyphs

Pumice Mine

Cactus Peak

VABM 5415

Hatwai Spring

Spring

Petroglyphs

Fumaroles

Fumaroles

VABM 6033

T. 42 N.

R. 38 E.

R. 39 E.

T. 41 N.

T. 22 S.
250000
FEET

36° 00'

T. 22 S.

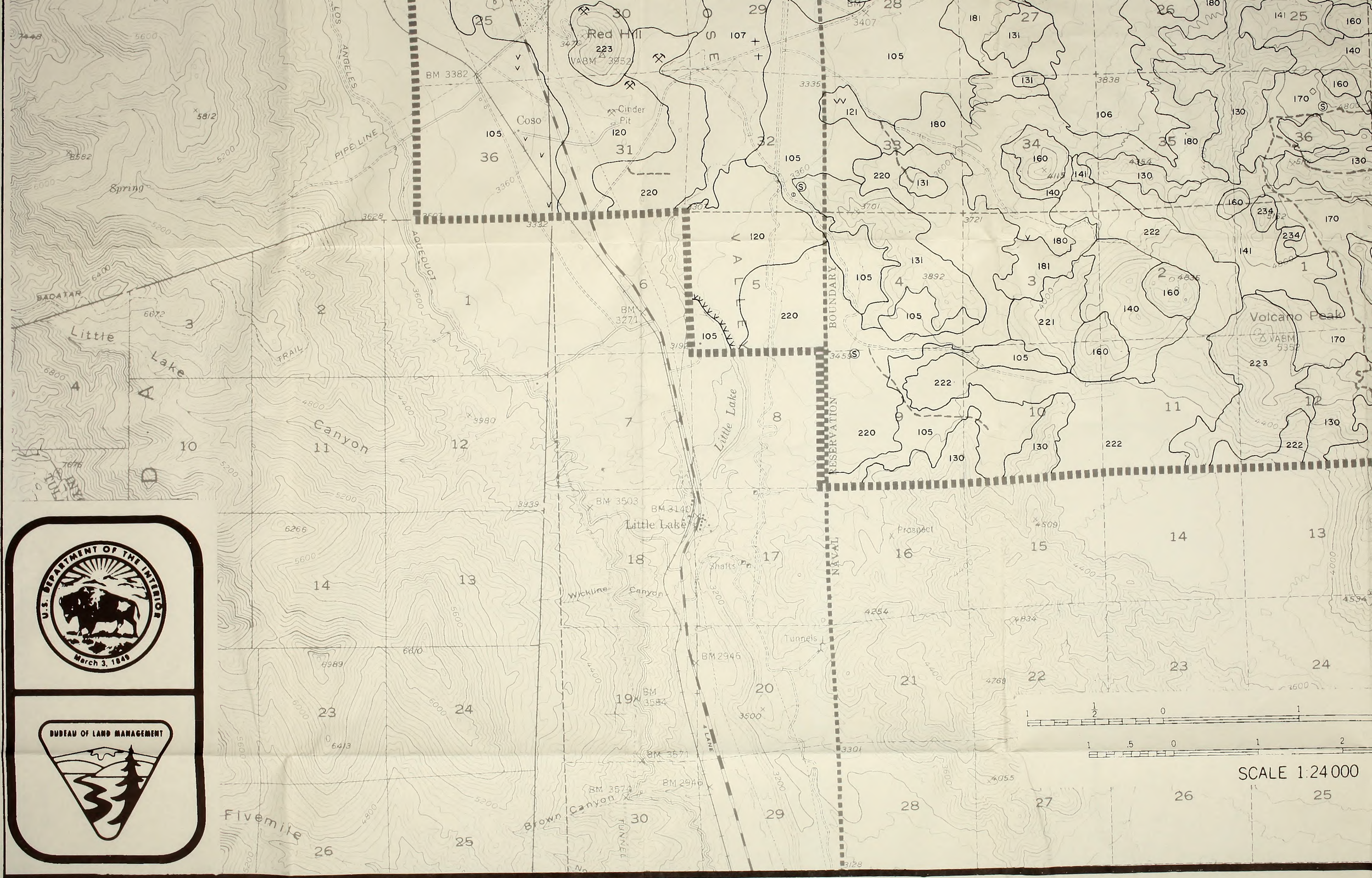
900 000
FEET

Tunawee Ranch
Tunawee Canyon
Portuguese Bench
Portuguese Canyon
Lewis Ranch
Coso Junction
Landing Strip
Gravel Pit
Spring
Sykes
Red Hill
Cinder Pit
Coso
Los Angeles Aqueduct
Los Angeles Aqueduct (Underground)
Los Angeles Pipeline
Naval Reservation Boundary
BM 3650
BM 3368
BM 3546
BM 3557
BM 3442
BM 3556
BM 3533
BM 3382
BM 3407
VABM 6130
VABM 3952
VABM 3685

Sugarloaf Mountain
Devils Kitchen
Fumarole
Fumaroles
Coso Hot Springs
BM 6633
VABM 4401
Prospect
Spring
Lava
Wash
Black
NAVAL RESERVATION BOUNDARY

T. 22 S.

900 000 FEET



U.S. DEPARTMENT OF THE INTERIOR
March 3, 1849

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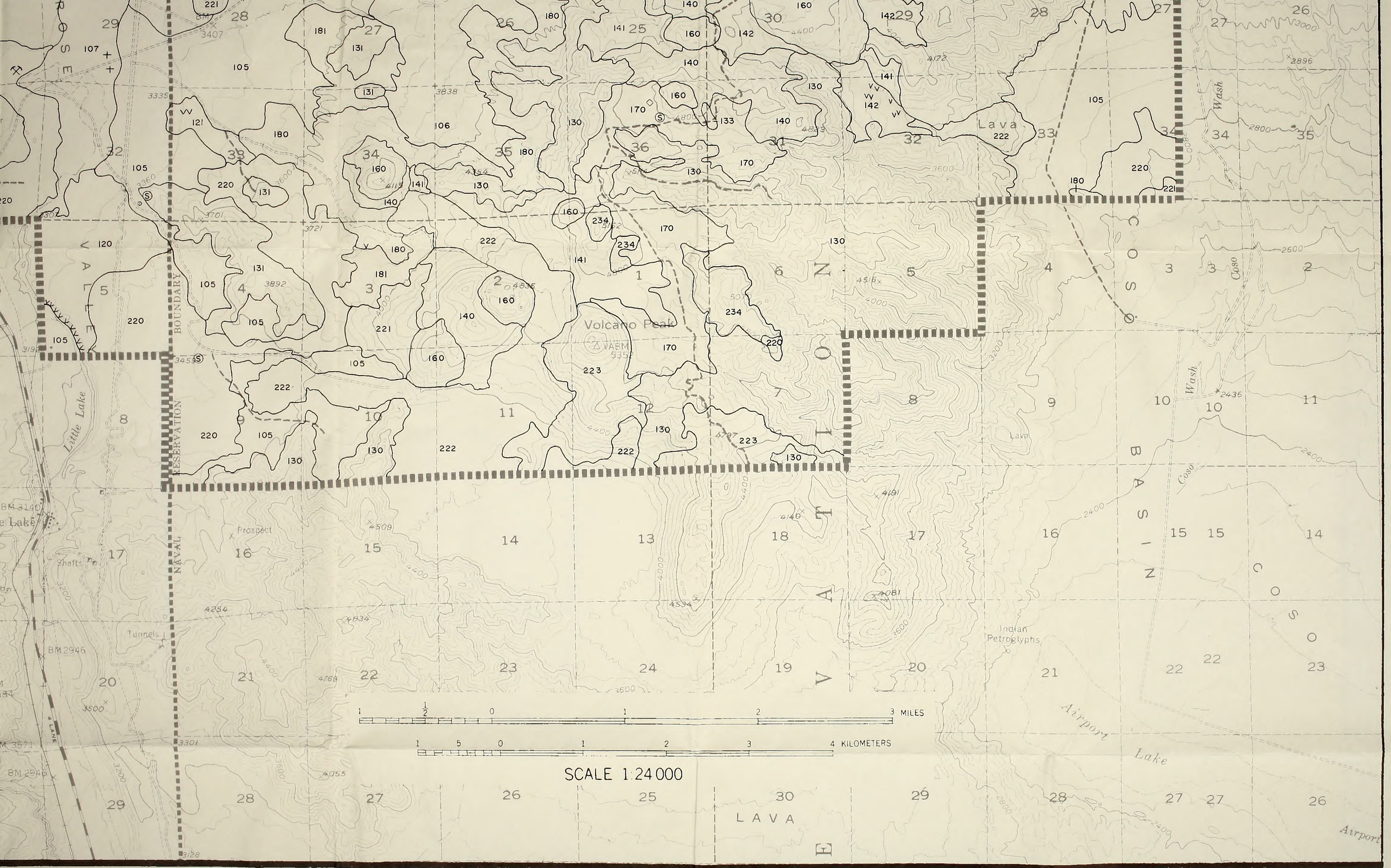
PLATE 2 - DETAILED SOILS MAP (SEE TABLE 6-1 FOR EXPLANATION)



E TABLE 6-1 FOR EXPLANATION)